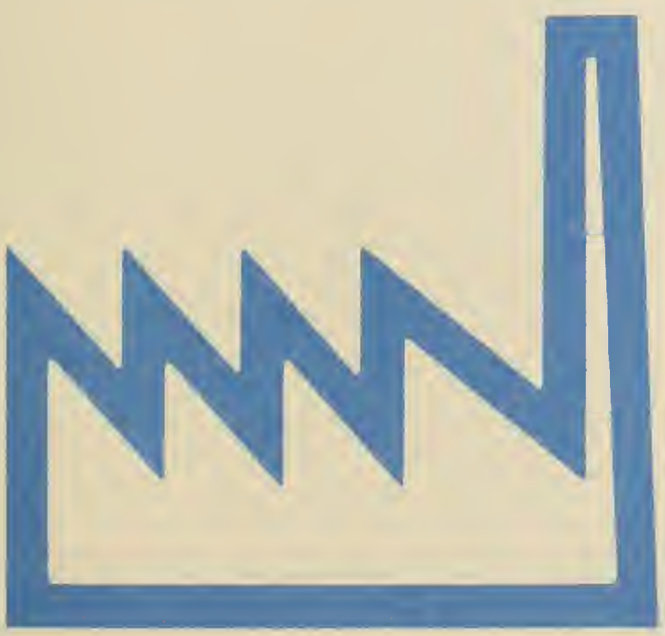
1982 Census of Manufactures

MC82-I-32E

INDUSTRY SERIES

Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products

Industries 3291, 3292, 3293, 3295, 3296, 3297, and 3299



U.S. Department of Commerce
BUREAU OF THE CENSUS

The publications
from the 1982 Economic and
Agriculture Censuses are dedicated
to the memory of Shirley Kallek,
Associate Director for Economic Fields.
During her career at the Bureau of the
Census (1955 to 1983), she continually
directed efforts to improve
the timeliness and accuracy of
economic statistics.

1982 Census of Manufactures

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INDUSTRY SERIES

Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products

3291	Abrasive Products
3292	Asbestos Products
3293	Gaskets, Packing and Sealing Devices
3295	Minerals, Ground or Treated
3296	Mineral Wool
3297	Nonclay Refractories
3299	Nonmetallic Mineral Products, N.E.C.

Issued March 1985

U.S. Department of Commerce
Malcolm Baldrige, Secretary
Clarence J. Brown, Deputy Secretary
Sidney Jones, Under Secretary for Economic Affairs

BUREAU OF THE CENSUS
John G. Keane,
Director

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If you heve eny questions concerning the statistics in this report, cell (301) 763-7304.

INTRODUCTION

ECONOMIC CENSUSES OVER TIME

The early beginnings of America's industrial output were first measured in the United States in the 1810 Decennial Census and again in 1820, when questions on manufacturing were included with those for population. Beginning with the 1840 Decennial Census, there were enumerations of manufactures and mineral industries at 10-year intervals up to and including the year 1900 for manufactures and 1940 for mineral industries. The latter census was again taken for 1954, 1958, 1963, and 1967.

Because of the increasing dominance of manufacturing in the early 20th century, Congress directed that quinquennial censuses of manufactures be taken beginning in 1905. However, from 1919 through 1939, these censuses were conducted every 2 years. The need for war-related current surveys in the early 1940's postponed the next census of manufactures until 1948 (for 1947). That census was again taken for 1954, 1958, 1963, and 1967.

Retail and wholesale trade data were first collected in 1930, and in 1933 information on selected service industries was added to the data-collection operation. These business censuses, as they were called, were again taken for 1935, 1939 (as part of the 1940 decennial program), 1948, 1954, 1958, 1963, and 1967.

Information on construction industries was obtained first in 1930 and again for 1935 and 1939. Data for the full spectrum of construction industries were not gathered again until 1968 (for 1967).

The need for transportation data to supplement information available from existing governmental or private sources was recognized by Congress in the late 1950's and early 1960's. The census of transportation (consisting of several surveys) was taken first for 1963 and again for 1967.

Since 1967, all of the above censuses have been taken quinquennially as part of the Census Bureau's economic census program. (For the 1977 censuses, the coverage of the service industries was broadened from "selected services" to "all services, except religious organizations and private households." A total of 41 additional four-digit standard industrial classifications[1] (SIC's) in 7 SIC major groups was added to the scope of the census. While most of the industries included for the first time for 1977 were covered again for 1982, some were not, i.e., hospitals; elementary and secondary schools; colleges, universities, and professional schools; junior colleges and technical institutes; labor unions and similar labor organizations; and political organizations.)

The first manufacturing census for an outlying area was conducted in Puerto Rico for the year 1909. Thereafter, with the exception of 1929, a census was taken at 10-year intervals through 1949. The first censuses of retail trade, wholesale trade, and selected service industries in Puerto Rico were conducted for 1939. These censuses also were taken for the years 1949, 1954, 1958, 1963, and 1967. A census of construction industries was introduced first in Puerto Rico for 1967. These censuses of Puerto Rico have been taken since then for the years 1972, 1977, and 1982.

Censuses of manufactures, retail trade, wholesale trade, and selected service industries were conducted in Guam and the Virgin Islands of the United States for 1958, 1963, 1967, 1972, 1977, and 1982. Censuses of mineral industries were taken in the Virgin Islands of the United States for the years 1958, 1963, and 1967 but not since that time. A census of construction industries was also undertaken in these areas for 1972, 1977, and 1982.

Retail trade, wholesale trade, selected service industries, manufacturing, and construction industries were canvassed for the first time in the Northern Mariana Islands in 1983 (for 1982).

For 1982, the economic censuses and agriculture censuses were conducted concurrently.

USES OF THE ECONOMIC CENSUSES

The economic censuses are the major source for facts about the structure and functioning of the Nation's economy and provide essential information for government, business, industry, and the general public. They provide an important part of the framework for such composite measures as the gross national product, input-output measures, indexes of industrial production, and indexes measuring productivity and price levels. Information from the censuses is used to establish sampling frames and as benchmarks for current surveys of business activity, which are essential for measuring short-term economic conditions.

State and local governments use census data to assess business activities within their jurisdictions. The private sector uses the data to forecast general economic conditions; analyze sales performance; lay out sales territories; allocate funds for advertising; decide on locations for new plants, warehouses, or stores; and measure potential markets in terms of size, geographic areas, kinds of business, and kinds of products made or sold.

Following every census, thousands of businesses and other users purchase reports. Likewise, census facts are disseminated widely by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. All 1982 data are available on microfiche from the U.S. Government Printing Office and most data on computer tape from the Census Bureau. Finally, the more than 50 State Data Centers also are suppliers of economic census statistics.

AUTHORITY AND SCOPE OF THE ECONOMIC CENSUSES

The economic censuses are required by law under title 13 of the United States Code, sections 131, 191, and 224, which directs that they be taken at 5-year intervals for the years ending in 2 and 7. The 1982 Economic Censuses covered manufacturing, mining, construction industries, retail trade, wholesale trade, service industries, and selected transportation activities. Special programs also cover minority-owned and women-owned businesses. The next economic censuses are scheduled to be taken in 1988 for the year 1987.

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[1]**Standard Industrial Classification Manual: 1972.** For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. **1977 Supplement.** Stock No. 003-00500176-0.

CENSUS OF MANUFACTURES

General

The 1982 Census of Manufactures is the 31st census of manufactures of the United States. For 1982, it was conducted jointly with the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses.

This report, from the 1982 Census of Manufactures, is one of a series of 82 industry reports, each of which provides statistics for groups of related industries. Additional separate reports will be issued for each State and on special subjects, such as size of establishments, legal form of organization, and fuels and electric energy consumed.

These separate reports will subsequently be issued as portions of the final census volumes. Volume I, Subject Statistics, will show comparative statistics for industries, States, and standard metropolitan statistical areas. It also will show selected subjects, such as concentration ratios in manufacturing, selected materials consumed, manufacturing activity in government establishments, and water use in manufacturing. Volume II, Industry Statistics, will be a consolidation of reports for the 82 groups of industries showing the same information that is shown in this report. Volume III, Geographic Area Statistics, will contain establishment-based data (number of establishments, employment, payroll, value added by manufacture, and capital expenditures) for each State and its important standard metropolitan statistical areas, counties, and places, by industry groups and important individual industries. Totals for "all manufacturing" will be shown for counties and places with more than 450 manufacturing employees. The introduction to the final volumes will discuss, at greater length, many of the subjects described in this introduction. For example, the volume text will discuss the relationship of value added by manufacture to National income by industry of origin, the changes in statistical concepts over the history of the censuses, and the valuation problems arising from intracompany transfers between manufacturing plants of a company and between manufacturing plants and sales offices and sales branches of a company.

Scope of Census and Definition of Manufacturing Industries

The 1982 Census of Manufactures covers all establishments employing one person or more primarily engaged in manufacturing as defined in the 1972 Standard Industrial Classification (SIC) Manual and its 1977 Supplement.[1] This is the system of industrial classification developed over a period of years by experts on classification in government and private industry under the guidance of the Office of Management and Budget. This system of classification is in general use among government agencies as well as organizations outside the government.

The SIC manual defines manufacturing as the mechanical or chemical transformation of inorganic or organic substances into new products. The assembly of component parts of products is also considered to be manufacturing if the resulting product is neither a structure nor other fixed improvement. These activities are usually carried on in plants, factories, or mills that characteristically use power-driven machines and materials handling equipment.

[1]**Standard Industrial Classification Manual: 1972.** For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. **1977 Supplement.** Stock No. 003-00500176-0.

Manufacturing production is usually carried on for the wholesale market, for transfers to other plants of the same company, or to the order of industrial users rather than for direct sale to the household consumer. Some manufacturers in a few industries sell chiefly at retail to household consumers through the mail, through house-to-house routes, or through salespersons. Some activities of a service nature (enameling, engraving, etc.) are included in manufacturing when they are performed primarily for the trade. They are considered nonmanufacturing when they are performed primarily to the order of the household consumer.

Relationship Between Annual Survey of Manufactures and Census of Manufactures

The Bureau of the Census conducts the annual survey of manufactures (ASM) in each of the 4 years between the censuses of manufactures. The ASM is based on a scientifically selected sample of approximately 55,000 establishments and collects the same industry statistics (employment, payroll, value of shipments, etc.) as the census of manufactures. In addition to collecting the information normally requested on the census form, the establishments in the ASM sample are requested to supply detailed information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services.

Establishment Basis of Reporting

The census of manufactures and the annual survey of manufactures are conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each location. Companies engaged in distinctly different lines of activity at one location are requested to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

In 1982, as in earlier years, a minimum size limit was set for including establishments in the census. All establishments employing one person or more at any time during the census year are included. The same size limitation has applied since 1947 in censuses and annual surveys of manufactures. In the 1939 and earlier censuses, establishments with less than $5,000 value of products were excluded. The change in the minimum size limit in 1947 does not appreciably affect the historical comparability of the census figures except for data on number of establishments for a few industries.

This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units that service manufacturing establishments of the same company (see Auxiliaries).

Manufacturing Universe and Census Report Forms

The 1982 Census of Manufactures universe includes approximately 345,000 establishments. The amounts of information requested from manufacturing establishments were dependent upon a number of factors. The more important considerations were the size of the company and whether it was included in the annual survey of manufactures. The methods of obtaining information for the various subsets of the universe to arrive at the aggregate figures shown in this publication are described below.

1. Small Single-Unit Companies Not Sent a Report Form

In the 1982 Census of Manufactures, approximately 140,000 small single-establishment companies were excused from filing reports. Selection of these small

establishments was done on an industry-by-industry basis and was based on annual payroll and total shipments data as well as on the industry classification codes contained in the administrative records of other Federal agencies. The cutoffs were selected so that these administrative records cases would account for no more than 3 percent of the value of shipments for the industry. Generally, all single-establishment companies with less than 5 employees were excused, while all establishments with more than 20 employees were mailed report forms.

Information on the physical location of the establishment, as well as information on payrolls, receipts (shipments), and industry classification, was obtained from the administrative records of other Federal agencies under special arrangements, which safeguarded their confidentiality. Estimates of data for these small establishments were developed using industry averages in conjunction with the administrative information. The value of shipments and cost of materials were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" (n.s.k.) categories.

The industry classification codes included in the administrative records files were assigned on the basis of brief descriptions of the general activity of the establishment. As a result, an indeterminate number of establishments were erroneously coded to the four-digit SIC level. This was especially true whenever there was a relatively fine line of demarcation between industries or between manufacturing and nonmanufacturing activity.

Sometimes these administrative record cases were given only a two- or three-digit SIC group. For the 1982 Census of Manufactures, these establishments were sent a separate classification form, which requested information on the products and services of the establishment. This form was used to code many of these establishments to the four-digit SIC level. Establishments that did not return the classification form were coded later to those four-digit SIC industries identified as "not elsewhere classified" (n.e.c.) within the given two- or three-digit industry groups.

As a result of these situations, a number of small establishments may have been misclassified by industry. However, such possible misclassifications have no significant effect on the statistics other than on the number of establishments.

The total establishment count for individual industries should be viewed as an approximation rather than a precise measurement. The counts for establishments with 20 employees or more are far more reliable than the count of total number of establishments.

2. Establishments Sent a Report Form

The 205,000 establishments covered in the mail canvass were divided into three groups:

a. **ASM sample establishments**—This group consisted of approximately 55,000 establishments covering all the units of large manufacturing establishments as well as a sample of the medium and smaller establishments. The probability of selection was proportionate to size (see appendix, Annual Survey of Manufactures).

In a census of manufactures year, the ASM report form (MA-1000) replaces the first page of the regular census form for those establishments included in the ASM. In addition to information on employment, payroll, and other items normally requested on the regular census form, establishments in the ASM sample were requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services. Results of the ASM inquiries are included in tables 3c and 3d of this report.

The census part of the report form is one of approximately 200 versions containing product, material, and special inquiries. The diversity of manufacturing activities necessitated the use of this many forms to canvass the approximately 450 manufacturing industries. Each form was developed for a group of related industries.

Appearing on each form was a list of products primary to the group of related industries, as well as secondary products and miscellaneous services that establishments classified in these industries were likely to be performing. Respondents were requested to identify the products, the value of each product, and, in a large number of cases, the quantity of the product shipped during the survey year. Space was also provided for the respondent to describe products not specifically identified on the form.

The report form also contained a materials-consumed inquiry, which varied from form to form depending on the industries being canvassed. The respondents were asked to review a list of materials generally used in their production processes. From this list, each establishment was requested to identify those materials consumed during the survey year, the cost of each, and, in certain cases, the quantity consumed. Once again, space was provided for the respondent to describe significant materials not identified on the form.

Finally, a wide variety of special inquiries was included to measure activities peculiar to a given industry, such as operations performed and equipment used.

b. **Large and medium establishments (non-ASM)**—Approximately 100,000 establishments were included in this group. A variable cutoff, based on administrative records payroll data and determined on an industry-by-industry basis, was used to select those establishments that were to receive one of the approximately 200 census of manufactures regular forms. The first page, requesting establishment data for items such as employment and payroll, was standard but did not contain the detailed statistics included on the ASM form. The product, material, and special inquiry sections supplied were based on the historical industry classification of the establishment.

c. **Small single-unit establishments (non-ASM)**—This group consisted of approximately 50,000 establishments. For those industries where application of the variable cutoff for administrative records cases resulted in a large number of small establishments being included in the mail canvass, an abbreviated or "short" form was used. These establishments received one of the approximately 80 versions of the short form, which requested summary product and material data and totals but no details on employment, payrolls, cost of materials, inventories, and capital expenditures.

Use of the short form has no adverse effect on published totals for the industry statistics; the same

data were collected on the short as well as the long form. However, detailed information on materials consumed was not collected on the short form; thus its use would increase the values of the n.s.k. categories.

Auxiliaries

In this industry report, the data on employment and payroll are limited to operating manufacturing establishments. The census report form filed for auxiliaries (ES-9200) requested a description of the activity of the establishments serviced. However, the auxiliaries were coded only to the two-digit major group of the establishments they served; whereas, the operating establishments were coded to a four-digit manufacturing industry. Data for the approximately 10,000 separately operated auxiliaries are included in the paperbound geographic area series, the bound volumes of the census of manufactures, and in a report issued as part of the 1982 Enterprise Statistics survey.

Auxiliaries are establishments whose employees are primarily engaged in performing supporting services for other establishments of the same company, rather than for the general public or for other business firms. They can be at different locations from the establishments served or at the same location as one of those establishments but not operating as an integral part thereof and serving two or more establishments. Where auxiliary operations are conducted at the same location as the manufacturing operation and operate as an integral part thereof, they usually are included in the report for the operating manufacturing establishment.

Included in the broad category of auxiliaries are administrative offices. Employees in administrative offices are concerned with the general management of multiestablishment companies, i.e., with the general supervision and control of two units or more, such as manufacturing plants, mines, sales branches, or stores. The functions of these employees may include (1) program planning, including sales research and coordination of purchasing, production, and distribution; (2) company purchasing, including general contracts and purchasing methods; (3) company financial policy and accounting, tax accounting, company sales and profit reports, and personnel accounting; (4) general engineering, including design of product machinery and equipment, and direction of engineering effort conducted at the individual operation locations; (5) direction of company personnel matters; and (6) legal and patent matters.

Other types of auxiliaries serving the plants or central management of the company include purchasing offices, sales promotion offices, research and development organizations, etc.

Industry Classification of Establishments

Each of the establishments covered in the census was classified in one of approximately 450 manufacturing industries in accordance with the industry definitions in the SIC system. Under this system of classification, an industry is generally defined as a group of establishments producing a single product or a closely related group of products. The product groupings from which industry classifications are derived are based on considerations such as similarity of manufacturing processes, types of materials used, types of customers, and the like. The resulting group of plants must be significant in terms of its number, value added by manufacture, value of shipments, and number of employees. The system operates in such a way that the definitions progressively became narrower with successive additions of numerical digits. There are 20 major groups (two-digit SIC), 143 industry groups (three-digit SIC), and approximately 450 industries (four-digit SIC). The product classes and products of the manufacturing industries have been assigned codes based on the industry from which they originate. There are about 1,500 classes of products, identified by a five-digit code, and about 11,000 products, identified by a seven-digit code. The seven-digit products are considered the primary products of the industry with the same four digits.

Accordingly, an establishment is usually classified in a particular industry on the basis of its major activity during a particular year, i.e., production of the products primary to that industry exceeds, in value, production of the products primary to any other single industry. In a few instances, however, the industry classification of an establishment is not only determined by the products it makes but also by the process employed in making those products. For example, establishments engaged in blast furnace operations, refining of nonferrous metals from ore, or rolling and drawing of nonferrous metals (processes which involve heavy capitalization in specialized equipment) would be classified according to the process used during a census year. These establishments then would be "frozen" in that industry during the following ASM years.

In either a census or ASM year, establishments included in the ASM sample with certainty weight, other than those involved with heavily capitalized activities described above, are reclassified by industry only if the change in the primary activity from the prior year is significant or the change has occurred for two successive years. This procedure prevents reclassification when there are minor shifts in product mix.

In ASM years, establishments included in the ASM sample with noncertainty weight are not shifted from one industry classification to another. They are retained in the industry where they were classified in the base census year (see appendix, Annual Survey of Manufactures). However, in the following census year, these ASM plants are allowed to shift from one industry to another.

The result of these rules covering the switching of plants from one industry classification to another is that, at the aggregate level, some industries comprise different mixes of establishments between survey years, and establishment data for such industry statistics as employment and payroll may be tabulated in different industries between survey years. Hence, comparisons between prior-year and current-year published totals, particularly at the four-digit SIC level, should be viewed with caution. This is true particularly for the comparison between the data shown for a census year versus the data shown for the previous ASM year.

As previously noted, the small establishments that may have been misclassified by industry are usually administrative-record cases whose industry codes were assigned on the basis of incomplete descriptions of the general activity of the establishment. Such possible misclassifications have no significant effect on the statistics other than on the number of establishments.

While some establishments produce only the primary products of the industry in which they are classified, all establishments of an industry rarely specialize to this extent. The industry statistics (employment, inventories, value added by manufacture, total value of shipments including resales and miscellaneous receipts, etc.) shown in tables 1a through 5a, therefore, reflect not only the primary activities of the establishments in that industry but also their secondary activities. The product statistics in tables 6a through 6c represent the output of all establishments whether or not they are classified in the same industry as the product. For this reason, in relating the industry statistics, especially the value of shipments to the product statistics, the

composition of the industry's output shown in table 5b should be considered.

The extent to which industry and product statistics may be matched with each other is measured by two ratios, which are computed from the figures shown in table 5b. The first of these ratios, called the primary product specialization ratio, measures the proportion of product shipments (both primary and secondary) of the establishments classified in the industry represented by the primary products of those establishments. The second ratio, called the coverage ratio, is the proportion of primary products shipped by the establishments classified in the industry to total shipments of such products by all manufacturing establishments.

However, establishments making products falling into the same industry category may use a variety of processes and materials to produce them. Also, the same industry classification (based on end products) may include both establishments that are highly integrated and those that put only the finishing touches on an already highly fabricated item. For example, the refrigeration industry includes instances of almost complete integration (production of the compressor, condensing unit, electric motor, casting, stamping of the case, and final assembly) all carried on at one plant. On the other hand, the condensing unit, the motor, and the case may be purchased and only assembled into the finished product.

In some instances, separate industry categories have been established for integrated and nonintegrated establishments. For other industries, the census provides separate statistics on the production of intermediate commodities made and used in the producing plant. For some industries characterized by many plants of the same company, separate figures on interplant transfer of products usually are shown.

Differences in the integration of production processes, types of operations, and alternatives in types of materials used should be considered when relating the industry statistics (employment, payrolls, value added, etc.) to the product and material data.

Value of Shipments for the Industry Compared With Value of Product Shipments

This industry report shows value of shipments data for industries and products. In tables 1a through 5a, these data represent the total value of shipments of all establishments classified in a particular industry. The data include the shipments of the products classified in the industry (primary to the industry), products classified in other industries (secondary to the industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Product shipments shown in table 6a represent the total value of shipments of products classified as primary to an industry that were shipped by all manufacturing establishments regardless of their industry classification.

CENSUS DISCLOSURE RULES

In accordance with Federal law governing census reports, no data are published that would disclose the data for an individual establishment or company. However, the number of establishments classified in a specific industry is not considered a disclosure, so this item may be given even though other information is withheld.

The disclosure analysis for the industry statistics in tables 1a through 5a of this report is based on the total value of shipments. When the total value of shipments cannot be shown without disclosing information for individual companies, the complete line has been suppressed. However, the suppressed data are included in higher level totals. Additional disclosure analysis is performed for new capital expenditures that can be suppressed even though value of shipments data are publishable.

MICROFICHE AND COMPUTER TAPES

All the data in this report are available on microfiche. Selected data are also available on computer tape.

In addition to selected published data being on computer tape, one major data series, the location of manufacturing plants, will be available only on computer tape. This series presents the number of establishments by employment size class by four-digit SIC industry codes for States, counties, and places of 2,500 inhabitants or more. These data are available for both State and county by industry, and State and place by industry.

Microfiche reports are sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Computer tapes are sold by the Data User Services Division, Customer Services (Tapes), Bureau of the Census, Washington, D.C. 20233.

SPECIAL TABULATIONS

Special tabulations of data collected in the 1982 Census of Manufactures may be obtained on computer tape or in tabular form. The data will be in summary form and subject to the same rules prohibiting disclosure of confidential information (including name, address, kind of business, or other data for individual business establishments or companies) as are the regular publications.

Special tabulations are prepared on a cost basis. A request for a cost estimate, as well as exact specifications on the type and format of the data to be provided, should be directed to the Chief, Industry Division, Bureau of the Census, Washington, D.C. 20233.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

Users' Guide for Locating Statistics

[For explanation of terms, see appendixes]

	Item	Four-digit industry statistics		
		Historical	Operating ratios	By geographic area
1	Number of companies	1a		
2	Number of manufacturing establishments	1a		2
	Employment and payroll:			
3	Number of employees	1a	1b	2
4	Payroll	1a	1b	2
5	Supplemental labor costs			
6	Production workers	1a	1b	2
7	Production-worker hours	1a	1b	2
8	Production-worker wages	1a	1b	2
	Shipments, cost of materials, and value added:			
9	Value of shipments (four-digit)	1a	1b	2
10	Product class shipments (five-digit)			
11	Product shipments (seven-digit)			
12	Value added by manufacture	1a	1b	2
13	Cost of materials	1a	1b	2
14	Fuels and electric energy			
15	Materials consumed by kind			
	Inventories:			
16	Total, end of year	1a		
17	By method of valuation			
18	By stage of fabrication			
	Capital expenditures, assets, rental payments, and purchased services:			
19	New capital expenditures	1a		2
20	Used plant and equipment expenditures			
21	Gross assets			
22	Depreciation			
23	Retirements of buildings and machinery			
24	Rental payments			
25	Purchased services			
	Ratios:			
26	Specialization	1a		
27	Coverage	1a		

*Number of companies with shipments of over $100 thousand.
**Detailed information shown.

in This Report by Table Number

Four-digit industry statistics—Con.				Five-digit product class and seven-digit product statistics				
Summary and supplemental	By employment size	By industry and product class specialization	Materials consumed by kind	Industry-product analysis	Product shipments	Product class by geographic area	Historical product class	
3a					*6a			1
**3a	4	5a						2
3a	4	5a						3
3a	4	5a						4
**3d								5
**3a	4	5a						6
**3a	4	5a						7
3a	4	5a						8
3a	4	5a		5b, 5c				9
				5b, 5c	6a	6b	6c	10
					6a			11
3a	4	5a						12
**3a	4	5a						13
3a, 3d								14
			7					15
3b, 3c	4							16
3b, 3c								17
3b								18
**3a, **3d	4	5a						19
**3a, **3d								20
**3d								21
**3d								22
**3d								23
**3d								24
**3d								25
3a				5b				26
3a				5b				27

Abrasive, Asbestos, and Miscellaneous Nonmetallic Mineral Products

CONTENTS

[Page numbers listed here omit the prefix that appears as part of the number of each page]

DESCRIPTION OF INDUSTRIES AND SUMMARY OF FINDINGS

ABRASIVE, ASBESTOS, AND MISCELLANEOUS NONMETALLIC MINERAL PRODUCTS

This report shows 1982 Census of Manufactures statistics for establishments classified in each of the following industries:

SIC Code	Title
3291	Abrasive Products
3292	Asbestos Products
3293	Gaskets, Packing and Sealing Devices
3295	Minerals, Ground or Treated
3296	Mineral Wool
3297	Nonclay Refractories
3299	Nonmetallic Mineral Products, N.E.C.

The industry statistics (employment, payroll, cost of materials, value of shipments, inventories, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments but also their activities in the manufacture of secondary products as well as their miscellaneous activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account in comparing industry statistics (tables 1a-5a) with product statistics (table 6a) showing shipments by all industries of the primary products of the specified industry. The extent of the "product mix" is indicated in table 5b, which shows the value of primary and secondary products shipped by establishments classified in the specified industry and also the value of primary products of the industry shipped as secondary products by establishments classified in other industries.

Small single-unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other government agencies. The remaining statistics were developed from industry averages.

Establishment data were tabulated based on industry definitions contained in the 1972 Standard Industrial Classification (SIC) Manual and its 1977 supplement.[1]

INDUSTRY 3291, ABRASIVE PRODUCTS

This industry comprises establishments primarily engaged in the manufacture of abrasive grinding wheels of natural or synthetic materials, and other abrasive products. Establishments primarily engaged in the cutting of grindstones, pulpstones, and whetstones at the quarry are classified in the mining industries.

In the 1982 Census of Manufactures, Industry 3291, Abrasive Products, recorded employment of 26.0 thousand. The total value of shipments for establishments classified in this industry was $2,751 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 8 percent below the 28.3 thousand reported in 1977. The leading States in employment in 1982 were Massachusetts, New York, Ohio, and Minnesota, accounting for approximately 60 percent of the industry's 1982 employment. Data for Minnesota have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when Massachusetts, New York, Ohio, and Illinois accounted for approximately 60 percent of the industry's employment.

Compared with 1981, employment decreased 17 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3291 shipped $2,035 million of products primary to the industry, $420 million of secondary products, and had $295 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 83 percent (specialization ratio). In 1977, this specialization ratio was 90 percent.

Establishments in this industry also accounted for 95 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 97 percent. The products primary to industry 3291, no matter in what industry they were produced, appear in table 6a and aggregate to $2,136 million in current prices.

The total cost of materials and services used by establishments classified in the abrasive products industry amounted to $1,277 million in current prices. Data on specific materials consumed appear in table 7.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 7 percent of total value of shipments.

[1] **Standard Industrial Classification Manual: 1972.** For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. **1977 Supplement.** Stock No. 003-005-00176-0.

INDUSTRY 3292, ASBESTOS PRODUCTS

This industry comprises establishments primarily engaged in the manufacture of asbestos textiles, asbestos building materials, except asbestos paper (industry 2661), insulating materials for covering boilers and pipes, and other commodities composed wholly or chiefly of asbestos. Establishments primarily engaged in the manufacture of gaskets and steam and other packing are classified in industry 3293.

In the 1982 Census of Manufactures, Industry 3292, Asbestos Products, recorded employment of 9.7 thousand. The total value of shipments for establishments classified in this industry was $843 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 30 percent below the 13.9 thousand reported in 1977. The leading States in employment in 1982 were Pennsylvania, Texas, New York, and New Jersey, accounting for approximately 50 percent of the industry's 1982 employment. Data for New York have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when Pennsylvania, California, New York, and Illinois accounted for approximately 40 percent of the industry's employment.

Compared with 1981, employment increased 1 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3292 shipped $762 million of products primary to the industry, $65 million of secondary products, and had $16 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 92 percent (specialization ratio). In 1977, this specialization ratio also was 92 percent.

Establishments in this industry also accounted for 91 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 81 percent. The products primary to industry 3292, no matter in what industry they were produced, appear in table 6a and aggregate to $841 million in current prices.

The total cost of materials and services used by establishments classified in the asbestos products industry amounted to $429 million in current prices. Data on specific materials consumed appear in table 7.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3293, GASKETS, PACKING AND SEALING DEVICES

This industry comprises establishments primarily engaged in the manufacture of gaskets, gasketing materials, compression packings, molded packings, oil seals, and mechanical seals. Included are gaskets, packing, and sealing devices made of leather rubber, metal, asbestos, and plastics. Establishments primarily engaged in the manufacture of insulation materials containing asbestos are classified in industry 3292.

In the 1982 Census of Manufactures, Industry 3293, Gaskets, Packing and Sealing Devices, recorded employment of 30.3 thousand. The total value of shipments for establishments classified in this industry was $1,666 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 8 percent below the 33.0 thousand reported in 1977. The leading States in employment in 1982 were Illinois, California, Texas, and Indiana, accounting for approximately 43 percent of the industry's 1982 employment. This represents a shift from 1977 when Illinois, California, Indiana, and Ohio accounted for approximately 45 percent of the industry's employment.

Compared with 1981, employment increased 1 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3293 shipped $1,486 million of products primary to the industry, $105 million of secondary products, and had $75 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 93 percent (specialization ratio). In 1977, this specialization ratio also was 93 percent.

Establishments in this industry also accounted for 89 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio also was 89 percent. The products primary to industry 3293, no matter in what industry they were produced, appear in table 6a and aggregate to $1,664 million in current prices.

The total cost of materials and services used by establishments classified in the gaskets, packing and sealing devices, industry amounted to $662 million in current prices. Data on specific materials consumed appear in table 7.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3295, MINERALS, GROUND OR TREATED

This industry comprises establishments primarily engaged in the crushing, grinding, pulverizing, and otherwise the preparing of certain earths, rocks, minerals, or slag for sale for industrial uses or for further manufacture. Establishments primarily engaged in the beneficiation of ores and the cleaning and grading of coal performed at the mine, or by primary preparation plants, are classified in the mining industries.

In the 1982 Census of Manufactures, Industry 3295, Minerals, Ground or Treated, recorded employment of 9.9 thousand. The total value of shipments for establishments classified in this industry was $1,256 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 14 percent below the 11.5 thousand reported in 1977. The leading States in employment in 1982 were California, Pennsylvania, Texas, and Arkansas, accounting for approximately 32 percent of the industry's 1982 employment. This represents a shift from 1977 when California, Pennsylvania, Michigan, and Ohio accounted for approximately 35 percent of the industry's employment.

Compared with 1981, employment decreased 12 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3295 shipped $1,166 million of products primary to the industry, $25 million of secondary products, and had $65 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 98 percent (specialization ratio). In 1977, this specialization ratio was 96 percent.

Establishments in this industry also accounted for 93 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 90 percent. The products primary to industry 3295, no matter in what industry they were produced, appear in table 6a and aggregate to $1,253 million in current prices.

The total cost of materials and services used by establishments classified in the minerals, ground or treated, industry amounted to $617 million in current prices.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 9 percent of total value of shipments.

INDUSTRY 3296, MINERAL WOOL

This industry comprises establishments primarily engaged in the manufacture of mineral wool and mineral wool insulation products made of such siliceous materials as rock, slag, and glass, or combinations thereof. Establishments primarily engaged in the manufacture of asbestos insulation products and textile glass fibers are classified in industries 3292 and 3229, respectively.

In the 1982 Census of Manufactures, Industry 3296, Mineral Wool, recorded employment of 19.7 thousand. The total value of shipments for establishments classified in this industry was $2,281 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 13 percent below the 22.6 thousand reported in 1977. The leading States in employment in 1982 were Ohio, New Jersey, Kansas, and California, accounting for approximately 48 percent of the industry's 1982 employment. This represents a shift from 1977 when Ohio, Kansas, New Jersey, and Indiana accounted for approximately 50 percent of the industry's employment.

Compared with 1981, employment decreased 10 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3296 shipped $2,144 million of products primary to the industry, $68 million of secondary products, and had $69 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 97 percent (specialization ratio). In 1977, this specialization ratio was 93 percent.

Establishments in this industry also accounted for 97 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio also was 96 percent. The products primary to industry 3296, no matter in what industry they were produced, appear in table 6a and aggregate to $2,215 million in current prices.

The total cost of materials and services used by establishments classified in the mineral wool industry amounted to $1,042 million in current prices. Data on specific materials consumed appear in table 7.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 6 percent of total value of shipments.

INDUSTRY 3297, NONCLAY REFRACTORIES

This industry comprises establishments primarily engaged in the manufacture of refractories and crucibles made of materials other than clay. Establishments primarily engaged in the manufacture of clay refractories are classified in industry 3255.

In the 1982 Census of Manufactures, Industry 3297, Nonclay Refractories, recorded employment of 6.8 thousand. The total value of shipments for establishments classified in this industry was $691 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 25 percent below the 9.1 thousand reported in 1977. The leading States in employment in 1982 were Ohio, Pennsylvania, New York, and Maryland, accounting for approximately 65 percent of the industry's 1982 employment. Data for New York and Maryland have been withheld to avoid disclosing data for individual companies. These same States were the leaders in 1977, when they accounted for approximately 60 percent of the industry's employment, although there has been some shift in the relative importance of individual States.

Compared with 1981, employment decreased 29 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3297 shipped $589 million of products primary to the industry, $95 million of secondary products, and had $7 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 86 percent (specialization ratio). In 1977, this specialization ratio was 92 percent.

Establishments in this industry also accounted for 82 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 83 percent. The products primary to industry 3297, no matter in what industry they were produced, appear in table 6a and aggregate to $716 million in current prices.

The total cost of materials and services used by establishments classified in the nonclay refractories industry amounted to $343 million in current prices. Data on specific materials consumed appear in table 7.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 3 percent of total value of shipments.

INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.

This industry comprises establishments primarily engaged in the factory production of statuary and art goods made of plaster of paris and papier mache, and in manufacturing sand lime products and other nonmetallic mineral products, not elsewhere classified.

In the 1982 Census of Manufactures, Industry 3299, Nonmetallic Mineral Products, N.E.C., recorded employment of 6.5 thousand. The total value of shipments for establishments classified in this industry was $422 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 16 percent below the 7.7 thousand reported in 1977. The leading States in employment in 1982 were New York, California, Ohio, and Pennsylvania, accounting for approximately 40 percent of the industry's 1982 employment. Data for California have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when New York, New Jersey, California,and Ohio accounted for approximately 50 percent of the industry's employment.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3299 shipped $393 million of products primary to the industry, $21 million of secondary products, and had $8 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 95 percent (specialization ratio). In 1977, this specialization ratio was 93 percent.

Establishments in this industry also accounted for 87 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 89 percent. The products primary to industry 3299, no matter in what industry they were produced, appear in table 6a and aggregate to $454 million in current prices.

The total cost of materials and services used by establishments classified in the nonmetallic mineral products, n.e.c., industry amounted to $178 million in current prices.

Establishments of single-unit companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 28 percent of total value of shipments.

Table 1a. Historical Statistics for the Industry: 1982 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year[1]	Companies[2] (no.)	All establishments[3] Total (no.)	All establishments[3] With 20 employees or more (no.)	All employees Number (1,000)	All employees Payroll (million dollars)	Production workers Number (1,000)	Production workers Hours (millions)	Production workers Wages (million dollars)	Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories[4] (million dollars)	Ratios Specialization (percent)	Ratios Coverage (percent)
INDUSTRY 3291, ABRASIVE PRODUCTS															
1982 Census	326	374	177	26.0	531.8	17.0	31.6	305.1	1 451.8	1 277.2	2 750.7	96.9	563.1	83	95
1981 ASM	(NA)	(NA)	(NA)	31.3	588.3	21.1	40.9	351.1	1 592.7	1 539.4	3 104.4	81.9	527.3	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	31.0	523.6	21.0	40.4	305.8	1 462.3	1 336.8	2 769.6	123.4	464.0	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	32.4	506.3	23.0	43.7	313.1	1 378.5	1 303.6	2 614.0	95.0	441.2	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	30.4	454.8	21.6	41.6	289.8	1 197.5	1 071.2	2 198.1	61.7	367.5	(NA)	(NA)
1977 Census	353	410	178	28.3	392.3	20.1	38.5	241.2	1 097.7	914.4	1 955.8	48.7	317.7	90	97
1976 ASM	(NA)	(NA)	(NA)	24.7	311.5	17.9	35.0	194.2	788.4	671.8	1 432.9	44.6	221.3	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	24.4	278.7	17.3	33.3	167.5	679.2	544.6	1 222.2	44.0	190.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	27.3	287.7	20.2	39.2	185.3	683.4	561.3	1 235.2	44.9	190.8	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	26.8	266.0	19.0	37.3	166.6	630.1	450.7	1 069.7	24.8	181.9	(NA)	(NA)
1972 Census	335	392	167	24.5	229.4	17.2	33.1	138.1	529.6	361.6	888.1	17.2	147.9	93	88
1971 ASM	(NA)	(NA)	(NA)	23.8	205.1	16.1	30.8	117.4	469.4	321.5	790.2	18.3	147.2	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	26.0	206.8	17.6	33.2	121.4	457.4	321.2	775.8	30.2	149.3	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	28.7	230.0	20.1	39.3	138.9	498.4	377.3	867.3	25.2	143.6	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	31.3	233.7	22.0	42.2	144.7	567.0	419.7	990.7	24.4	160.4	(NA)	(NA)
1967 Census	320	361	165	27.2	197.5	18.9	36.3	119.1	420.7	306.5	725.3	30.4	128.2	91	85
INDUSTRY 3292, ASBESTOS PRODUCTS															
1982 Census	77	96	53	9.7	179.8	7.4	14.6	126.6	397.4	429.3	842.8	31.3	148.0	92	91
1981 ASM	(NA)	(NA)	(NA)	9.6	191.2	7.6	15.4	136.1	466.0	440.4	890.2	33.7	161.5	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	9.7	177.7	7.9	16.0	128.1	421.6	454.6	877.1	33.6	151.9	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	12.2	208.8	10.1	20.8	155.7	510.5	516.8	1 024.4	46.6	182.2	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	14.2	204.3	11.4	23.6	157.0	491.8	496.4	974.9	36.2	177.8	(NA)	(NA)
1977 Census	86	123	76	13.9	179.9	11.0	22.6	137.4	439.3	448.7	882.1	26.0	168.0	92	81
1976 ASM	(NA)	(NA)	(NA)	16.6	193.1	13.0	26.7	145.0	512.1	484.1	988.5	20.1	182.8	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	17.3	189.5	13.5	26.9	139.7	461.0	437.6	900.1	23.1	171.1	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	21.0	219.3	16.9	35.3	168.4	489.9	492.7	963.1	32.4	183.6	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	21.3	204.6	17.1	35.6	155.2	442.0	382.4	823.6	29.3	150.5	(NA)	(NA)
1972 Census	87	142	97	21.0	191.0	16.6	34.5	142.8	426.1	343.5	763.4	20.4	136.3	91	88
1971 ASM	(NA)	(NA)	(NA)	18.9	159.6	14.7	30.7	119.9	350.5	290.8	632.6	16.2	122.3	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	18.9	150.4	14.7	30.8	112.6	315.7	268.5	585.3	16.1	112.9	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	22.2	168.9	17.7	37.7	128.9	363.8	297.7	658.8	20.1	117.8	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	21.5	152.8	17.0	35.7	114.9	336.9	279.8	613.5	15.8	121.4	(NA)	(NA)
1967 Census	81	138	99	21.3	144.0	16.8	35.0	107.5	308.1	263.9	575.0	18.9	111.0	93	90
INDUSTRY 3293, GASKETS, PACKING, AND SEALING DEVICES															
1982 Census	409	473	241	30.3	495.4	21.8	41.5	307.9	997.6	661.6	1 666.0	53.0	339.0	93	89
1981 ASM	(NA)	(NA)	(NA)	30.0	464.2	21.9	41.4	290.2	1 052.6	757.2	1 781.2	60.8	327.9	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	31.0	446.7	22.3	41.9	276.6	933.4	674.5	1 610.4	62.0	295.8	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	35.9	462.6	26.6	51.1	294.0	1 015.9	703.2	1 675.4	47.1	300.5	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	34.3	417.8	26.1	49.5	266.7	907.1	592.5	1 481.0	49.2	240.5	(NA)	(NA)
1977 Census	384	433	217	33.0	371.3	25.0	47.5	237.3	748.3	524.9	1 267.1	46.5	208.6	93	89
1976 ASM	(NA)	(NA)	(NA)	27.6	300.9	20.7	41.3	191.6	621.6	417.5	1 019.3	35.9	181.3	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	25.6	259.7	19.0	37.3	162.3	487.8	351.3	842.2	32.2	151.7	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	27.9	262.4	21.2	41.8	170.9	498.6	348.6	834.7	32.4	148.1	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	28.3	240.8	21.7	42.9	158.7	453.8	280.4	723.0	20.7	117.3	(NA)	(NA)
1972 Census	346	374	184	27.7	220.4	21.1	42.7	146.9	428.5	252.6	665.4	24.9	101.9	89	81
INDUSTRY 3295, MINERALS, GROUND OR TREATED															
1982 Census	279	436	142	9.9	188.9	7.4	14.3	128.6	637.4	617.1	1 256.5	71.7	192.0	98	93
1981 ASM	(NA)	(NA)	(NA)	11.3	191.6	9.2	18.4	140.8	691.4	601.9	1 282.9	98.4	149.9	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	11.0	172.8	9.2	19.4	131.2	667.1	575.6	1 224.6	104.2	127.7	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	13.7	230.6	11.3	24.0	175.2	744.8	621.9	1 357.2	78.0	131.8	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	11.9	179.9	9.3	19.4	129.3	620.2	584.6	1 197.5	70.6	140.5	(NA)	(NA)
1977 Census	318	466	151	11.5	156.3	8.9	18.1	111.8	479.4	480.6	957.3	50.2	116.3	96	90
1976 ASM	(NA)	(NA)	(NA)	12.4	144.0	10.0	19.9	101.7	496.3	381.4	878.5	77.9	105.2	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	11.6	126.5	9.3	19.1	91.0	379.1	285.0	660.0	65.8	86.4	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	11.8	117.1	9.5	20.1	85.4	316.1	291.3	597.8	50.2	68.8	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	10.7	101.7	8.4	17.7	77.9	283.2	198.2	461.6	35.1	45.9	(NA)	(NA)
1972 Census	349	488	152	9.5	87.9	7.6	16.2	64.6	237.2	177.3	414.4	30.0	40.3	95	89
1971 ASM	(NA)	(NA)	(NA)	11.3	92.7	9.1	19.8	70.2	237.9	173.9	415.1	35.2	44.7	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	11.7	93.5	9.7	20.9	72.0	251.9	170.0	417.1	34.9	44.7	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	10.9	79.1	8.6	18.1	57.9	222.5	153.9	372.2	20.1	34.6	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	9.6	68.8	7.6	16.0	50.4	182.7	154.0	334.9	32.2	32.5	(NA)	(NA)
1967 Census	382	504	130	8.9	59.3	7.0	14.4	41.7	149.4	132.4	280.9	23.5	27.3	95	89
INDUSTRY 3296, MINERAL WOOL															
1982 Census	132	179	94	19.7	438.9	15.5	31.9	334.2	1 236.7	1 041.5	2 281.1	67.0	180.1	97	97
1981 ASM	(NA)	(NA)	(NA)	21.8	448.9	17.0	35.2	344.4	1 245.1	1 106.7	2 338.6	91.4	201.3	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	22.0	418.4	17.7	37.2	323.0	1 215.5	1 031.8	2 235.4	109.2	186.0	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	24.1	412.2	19.6	40.8	323.9	1 221.4	962.3	2 180.1	116.3	172.0	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	24.1	371.2	19.7	41.1	289.0	1 161.6	874.6	2 019.1	209.4	149.3	(NA)	(NA)
1977 Census	95	153	90	22.6	313.8	18.6	38.3	244.5	1 053.7	738.6	1 790.5	85.9	121.5	93	96
1976 ASM	(NA)	(NA)	(NA)	20.3	263.2	16.6	34.5	206.2	767.5	628.4	1 389.7	35.0	115.3	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	18.1	210.2	14.5	29.5	160.4	617.0	528.0	1 145.5	81.0	100.4	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	19.5	218.7	16.0	33.7	171.4	596.8	468.1	1 059.8	102.6	86.2	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	18.7	194.0	15.5	32.5	152.5	521.5	351.1	868.9	58.5	67.6	(NA)	(NA)
1972 Census	66	108	75	18.0	172.3	14.7	30.8	135.7	441.5	315.6	755.4	50.1	54.9	93	93
1971 ASM	(NA)	(NA)	(NA)	16.2	146.7	13.1	28.4	115.3	367.5	269.7	640.3	45.0	48.1	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	15.8	134.2	12.8	26.7	104.7	320.8	244.2	559.5	32.4	48.7	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	15.3	123.8	12.4	26.0	97.5	315.4	227.1	539.7	25.0	42.2	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	14.5	111.6	11.7	24.6	87.7	279.5	211.2	486.4	28.0	38.3	(NA)	(NA)
1967 Census	77	116	74	15.1	106.9	12.2	25.5	83.9	247.3	204.4	454.4	27.2	35.3	92	96

See footnotes at end of table.

Table 1a. **Historical Statistics for the Industry: 1982 and Earlier Years**—Con.

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year[1]	Companies[2] (no.)	All establishments[3]		All employees		Production workers			Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories[4] (million dollars)	Ratios	
		Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization (percent)	Coverage (percent)
INDUSTRY 3297, NONCLAY REFRACTORIES															
1982 Census	76	119	66	6.8	148.4	4.6	8.7	93.0	333.1	343.3	691.0	48.5	222.9	86	82
1981 ASM	(NA)	(NA)	(NA)	9.6	196.5	6.8	13.0	130.3	556.3	484.7	1 020.9	69.7	234.4	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	9.7	177.4	7.0	13.6	120.0	488.9	482.3	975.9	47.2	204.2	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	10.3	172.5	7.6	15.0	120.7	520.9	434.6	934.9	24.4	192.8	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	10.5	162.7	8.0	15.7	115.5	443.9	434.9	864.2	43.1	185.3	(NA)	(NA)
1977 Census	74	109	66	9.1	134.3	6.8	13.5	92.5	352.1	336.4	680.2	37.1	159.5	92	83
1976 ASM	(NA)	(NA)	(NA)	9.0	122.8	6.7	13.3	85.3	329.4	316.7	643.0	25.6	152.2	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	8.9	111.8	6.5	13.1	77.4	287.3	275.8	564.9	29.2	137.2	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	10.9	122.7	8.5	17.5	90.1	335.9	286.9	609.2	24.8	132.6	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	9.2	96.3	7.1	14.8	69.3	249.1	203.7	445.0	16.5	92.0	(NA)	(NA)
1972 Census	60	90	60	8.1	78.3	6.0	12.8	54.5	191.1	151.1	342.1	9.3	81.6	94	84
1971 ASM	(NA)	(NA)	(NA)	8.9	78.7	6.3	12.6	51.0	184.4	147.4	331.4	21.0	92.2	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	9.9	84.2	7.4	15.1	58.0	197.8	162.6	353.8	20.1	90.3	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	9.4	77.4	7.2	14.8	53.5	185.8	160.0	347.5	21.1	73.6	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	9.5	72.8	7.1	14.4	49.4	164.7	150.1	315.8	16.4	79.1	(NA)	(NA)
1967 Census	59	92	64	9.9	72.1	7.4	14.8	49.5	158.7	149.7	307.1	17.3	87.0	90	88
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.															
1982 Census	569	583	67	6.5	94.5	4.8	10.0	63.9	240.3	177.7	422.3	38.3	60.6	95	87
1981 ASM	(NA)	(NA)	(NA)	9.6	124.3	7.2	15.4	83.4	304.2	197.6	500.7	25.3	40.4	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	9.7	122.6	7.2	15.1	78.4	331.8	219.8	536.1	127.3	61.7	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	9.9	121.3	7.8	15.3	88.5	320.8	191.8	508.0	31.4	43.8	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	8.0	95.5	6.4	12.7	63.0	266.4	169.4	434.8	36.8	45.0	(NA)	(NA)
1977 Census	681	696	70	7.7	87.2	6.2	11.4	59.1	224.1	166.6	387.3	28.7	46.9	93	89
1976 ASM	(NA)	(NA)	(NA)	7.8	79.8	6.3	11.7	56.4	196.6	128.0	325.3	31.0	36.4	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	6.9	64.4	5.5	10.8	43.2	135.6	112.2	253.9	18.4	29.9	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	7.8	61.4	6.3	12.2	44.3	144.3	92.9	230.9	[6]11.0	31.0	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	7.1	53.6	6.0	11.1	37.5	133.5	73.1	200.2	9.0	18.0	(NA)	(NA)
1972 Census	480	491	81	6.3	46.0	5.2	9.9	31.9	104.7	58.7	166.5	5.0	16.1	94	90
1971 ASM	(NA)	(NA)	(NA)	4.8	36.4	3.8	7.6	25.3	72.8	50.8	123.1	5.3	27.0	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	4.2	29.9	3.3	6.6	19.8	60.5	38.4	98.7	2.5	24.2	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	4.7	29.2	3.7	6.7	19.7	57.7	46.6	104.5	3.3	11.8	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	4.9	29.6	4.0	7.4	20.8	56.6	43.6	100.0	2.9	11.0	(NA)	(NA)
1967 Census	325	330	53	5.3	30.6	4.3	8.3	21.1	56.8	43.5	99.9	2.2	11.6	83	89

[1]In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1967, see 1967 Census of Manufactures, vol. II, table 1 of the Industry chapter.

[2]For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

[3]Includes establishments with payroll at any time during year.

[4]Effective with the 1982 Economic Censuses, uniform instructions for reporting inventories were introduced for all sector reports. Up to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

Because of this change in reporting instructions, the 1982 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown above and in historical census of manufactures and annual survey of manufactures publications. Inventories and value added data estimated on a basis comparable to the historical data, using the reported information for 1982, are shown below:

Industries	End-of-1981 inventories (million dollars)	End-of-1982 inventories (million dollars)	1982 value added by manufacture (million dollars)
Industry 3291, Abrasive products	534.0	484.9	1 448.7
Industry 3292, Asbestos products	168.1	141.1	397.3
Industry 3293, Gaskets, packing, and sealing devices	331.1	312.0	994.6
Industry 3295, Minerals, ground or treated	182.9	178.0	636.7
Industry 3296, Mineral wool	189.3	169.7	1 236.1
Industry 3297, Nonclay refractories	218.7	200.7	338.7
Industry 3299, Nonmetallic mineral products, n.e.c.	67.1	59.7	240.3

See Inventories in appendixes for explanation of the difference between end-of-1981 inventory figure shown in table and corresponding figure shown in footnote.

[5]Industry was defined or redefined for 1972 Census of Manufactures, so data are available only for years shown.

[6]Estimate for new capital expenditures has associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

Table 1b. Selected Operating Ratios for the Industry: 1982 and Earlier Years

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
	INDUSTRY 3291, ABRASIVE PRODUCTS								
1982 Census	20 454	65	1 859	9.66	46	66	55 838	37	45.94
1981 ASM	18 796	67	1 938	8.58	50	69	50 885	37	38.94
1980 ASM	16 890	68	1 924	7.57	48	67	47 171	36	36.20
1979 ASM	15 627	71	1 900	7.16	50	69	42 546	37	31.54
1978 ASM	14 961	71	1 926	6.97	49	69	39 391	38	28.79
1977 Census	13 862	71	1 915	6.26	47	67	38 788	36	28.51
1976 ASM	12 611	72	1 955	5.55	47	69	31 919	40	22.53
1975 ASM	11 422	71	1 925	5.03	45	67	27 836	41	20.40
1974 ASM	10 538	74	1 941	4.73	45	69	25 033	42	17.43
1973 ASM	9 925	71	1 963	4.47	42	67	23 511	42	16.89
1972 Census	9 363	70	1 924	4.17	41	67	21 616	43	16.00
1971 ASM	8 618	68	1 913	3.81	41	67	19 723	44	15.24
1970 ASM	7 954	68	1 886	3.66	41	68	17 592	45	13.78
1969 ASM	8 014	70	1 955	3.53	44	70	17 366	46	12.68
1968 ASM	7 466	70	1 918	3.43	42	66	18 115	41	13.44
1967 Census	7 261	69	1 921	3.28	42	69	15 467	47	11.59
	INDUSTRY 3292, ASBESTOS PRODUCTS								
1982 Census	18 536	76	1 973	8.67	51	72	40 969	45	27.22
1981 ASM	19 917	79	2 026	8.84	49	71	48 542	41	30.26
1980 ASM	18 320	81	2 025	8.01	52	72	43 464	42	26.35
1979 ASM	17 115	83	2 059	7.49	50	71	41 844	41	24.54
1978 ASM	14 387	80	2 070	6.65	51	72	34 634	42	20.84
1977 Census	12 942	79	2 055	6.08	51	71	31 604	41	19.44
1976 ASM	11 633	78	2 054	5.43	49	69	30 849	38	19.18
1975 ASM	10 954	78	1 993	5.19	49	70	26 647	41	17.14
1974 ASM	10 443	80	2 089	4.77	51	74	23 329	45	13.88
1973 ASM	9 606	80	2 082	4.36	46	71	20 751	46	12.42
1972 Census	9 095	79	2 078	4.14	45	70	20 290	45	12.35
1971 ASM	8 444	78	2 088	3.91	46	71	18 545	46	11.42
1970 ASM	7 958	78	2 095	3.66	46	72	16 704	48	10.25
1969 ASM	7 608	80	2 130	3.42	45	71	16 387	46	9.65
1968 ASM	7 107	79	2 100	3.22	46	71	15 670	45	9.44
1967 Census	6 761	79	2 083	3.07	46	71	14 465	47	8.80
	INDUSTRY 3293, GASKETS, PACKING, AND SEALING DEVICES								
1982 Census	16 350	72	1 904	7.42	40	69	32 924	50	24.04
1981 ASM	15 473	73	1 890	7.01	43	69	35 087	44	25.43
1980 ASM	14 410	72	1 879	6.60	42	70	30 110	48	22.28
1979 ASM	12 886	74	1 921	5.75	42	70	28 298	46	19.88
1978 ASM	12 181	76	1 897	5.39	40	68	26 446	46	18.33
1977 Census	11 252	76	1 900	5.00	41	71	22 676	50	15.75
1976 ASM	10 902	75	1 995	4.64	41	70	22 522	48	15.05
1975 ASM	10 145	74	1 963	4.35	42	73	19 055	53	13.08
1974 ASM	9 405	76	1 972	4.09	42	73	17 871	53	11.93
1973 ASM	8 509	77	1 977	3.70	39	72	16 035	53	10.58
1972 Census	7 957	76	2 024	3.44	38	71	15 469	51	10.04
	INDUSTRY 3295, MINERALS, GROUND OR TREATED								
1982 Census	19 081	75	1 932	8.99	49	64	64 384	30	44.57
1981 ASM	16 956	81	2 000	7.65	47	62	61 186	28	37.58
1980 ASM	15 709	84	2 109	6.76	47	61	60 645	26	34.39
1979 ASM	16 832	82	2 124	7.30	46	63	54 365	31	31.03
1978 ASM	15 118	78	2 086	6.66	49	64	52 118	29	31.97
1977 Census	13 591	77	2 034	6.18	50	67	41 687	33	26.49
1976 ASM	11 613	81	1 990	5.11	43	60	40 024	29	24.94
1975 ASM	10 905	80	2 054	4.76	43	62	32 681	33	19.85
1974 ASM	9 924	81	2 116	4.25	49	68	26 788	37	15.73
1973 ASM	9 505	79	2 107	4.40	43	65	26 467	36	16.00
1972 Census	9 253	80	2 132	3.99	43	64	24 968	37	14.64
1971 ASM	8 204	81	2 176	3.55	42	64	21 053	39	12.02
1970 ASM	7 991	83	2 155	3.44	41	63	21 530	37	12.05
1969 ASM	7 257	79	2 105	3.20	41	63	20 413	36	12.29
1968 ASM	7 167	79	2 105	3.15	46	67	19 031	38	11.42
1967 Census	6 663	79	2 057	2.90	47	68	16 787	40	10.38
	INDUSTRY 3296, MINERAL WOOL								
1982 Census	22 279	79	2 058	10.48	46	65	62 777	35	38.77
1981 ASM	20 592	78	2 071	9.78	47	67	57 115	36	35.37
1980 ASM	19 018	80	2 102	8.68	46	65	55 250	34	32.67
1979 ASM	17 104	81	2 082	7.94	44	63	50 680	34	29.94
1978 ASM	15 402	82	2 086	7.03	43	62	48 199	32	28.26
1977 Census	13 885	82	2 059	6.38	41	59	46 624	30	27.51
1976 ASM	12 966	82	2 078	5.98	45	64	37 808	34	22.25
1975 ASM	11 613	80	2 034	5.44	46	64	34 088	34	20.92
1974 ASM	11 215	82	2 106	5.09	44	65	30 605	37	17.71
1973 ASM	10 374	83	2 097	4.69	40	63	27 888	37	16.05
1972 Census	9 572	82	2 095	4.41	42	65	24 528	39	14.33
1971 ASM	9 056	81	2 168	4.06	42	65	22 685	40	12.94
1970 ASM	8 494	81	2 086	3.92	44	68	20 304	42	12.01
1969 ASM	8 092	81	2 097	3.75	42	65	20 614	39	12.13
1968 ASM	7 697	81	2 103	3.57	43	66	19 276	40	11.36
1967 Census	7 079	81	2 090	3.29	45	69	16 377	43	9.70

See footnotes at end of table.

Table 1b. Selected Operating Ratios for the Industry: 1982 and Earlier Years—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
	INDUSTRY 3297, NONCLAY REFRACTORIES								
1982 Census	21 824	68	1 891	10.69	50	71	48 985	45	38.29
1981 ASM	20 469	71	1 912	10.02	47	67	57 948	35	42.79
1980 ASM	18 289	72	1 943	8.82	49	68	50 402	36	35.95
1979 ASM	16 748	74	1 974	8.05	46	65	50 573	33	34.73
1978 ASM	15 495	76	1 962	7.36	50	69	42 276	37	28.27
1977 Census	14 758	75	1 985	6.85	49	69	38 692	38	26.08
1976 ASM	13 644	74	1 985	6.41	49	68	36 600	37	24.77
1975 ASM	12 562	73	2 015	5.91	49	69	32 281	39	21.93
1974 ASM	11 257	78	2 059	5.15	47	67	30 817	37	19.19
1973 ASM	10 467	77	2 085	4.68	46	67	27 076	39	16.83
1972 Census	9 667	74	2 133	4.26	44	67	23 593	41	14.93
1971 ASM	8 843	71	2 000	4.05	44	68	20 719	43	14.63
1970 ASM	8 505	75	2 041	3.84	46	70	19 980	43	13.10
1969 ASM	8 234	77	2 056	3.61	46	68	19 766	42	12.55
1968 ASM	7 663	75	2 028	3.43	48	71	17 337	44	11.44
1967 Census	7 283	75	2 000	3.34	49	72	16 030	45	10.72
	INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.								
1982 Census	14 538	74	2 083	6.39	42	64	36 969	39	24.03
1981 ASM	12 948	75	2 139	5.42	39	64	31 688	41	19.75
1980 ASM	12 639	74	2 097	5.19	41	64	34 206	37	21.97
1979 ASM	12 253	79	1 962	5.78	38	62	32 404	38	20.97
1978 ASM	11 938	80	1 984	4.96	39	61	33 300	36	20.98
1977 Census	11 325	81	1 839	5.18	43	66	29 104	39	19.66
1976 ASM	10 231	81	1 857	4.82	39	64	25 205	41	16.80
1975 ASM	9 333	80	1 964	4.00	44	70	19 652	47	12.56
1974 ASM	7 872	81	1 937	3.63	40	67	18 500	43	11.83
1973 ASM	7 549	85	1 850	3.38	37	63	18 803	40	12.03
1972 Census	7 302	83	1 904	3.22	35	63	16 619	44	10.58
1971 ASM	7 583	79	2 000	3.33	41	71	15 167	50	9.58
1970 ASM	7 119	79	2 000	3.00	39	69	14 405	49	9.17
1969 ASM	6 213	79	1 811	2.94	45	73	12 277	51	8.61
1968 ASM	6 041	82	1 850	2.81	44	73	11 551	52	7.65
1967 Census	5 774	81	1 930	2.54	44	74	10 717	54	6.84

Note: For qualifications of data, see footnotes on table 1a.

Table 2. Industry Statistics for Selected States: 1982 and 1977

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982												1977	
		All establishments[2]		All employees		Production workers			Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees[3] (1,000)	Value added by manufacture (million dollars)
	E[1]	Total (no.)	With 20 employees or more (no.)	Number[3] (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
INDUSTRY 3291, ABRASIVE PRODUCTS														
United States	–	**374**	**177**	**26.0**	531.8	**17.0**	**31.6**	**305.1**	**1 451.8**	**1 277.2**	**2 750.7**	**96.9**	**28.3**	**1 097.7**
California	E6	38	14	1.0	18.3	.6	1.2	10.3	48.9	32.5	82.8	1.4	CC	(D)
Connecticut	E2	7	6	.4	8.8	.3	.6	5.5	20.7	28.8	48.4	.6	.4	13.5
Georgia	–	6	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois	E1	36	20	1.8	36.0	1.2	2.4	19.8	96.1	48.9	147.6	4.1	2.3	83.2
Indiana	–	9	3	.2	2.2	.1	.2	1.4	8.9	3.8	12.6	.1	AA	(D)
Iowa	–	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Massachusetts	–	27	17	5.9	125.9	3.2	5.6	55.8	212.4	135.0	362.3	31.6	6.2	170.0
Michigan	E2	42	17	1.2	22.3	.8	1.5	12.8	50.0	39.5	90.5	2.8	1.6	46.5
Minnesota	–	5	3	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Mississippi	–	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
New Jersey	E5	26	10	.5	8.6	.4	.7	5.1	21.5	16.0	37.7	(D)	.6	16.6
New York	–	36	15	4.3	91.8	3.0	5.2	54.2	163.0	165.6	330.7	18.5	4.6	138.7
North Carolina	–	11	4	.3	3.8	.2	.4	2.0	10.1	12.8	23.2	.5	(NA)	(NA)
Ohio	–	40	21	3.2	64.7	2.2	3.9	36.4	200.3	107.9	308.3	16.4	3.3	142.8
Pennsylvania	E1	30	18	1.0	17.4	.6	1.2	10.1	38.0	41.9	80.3	1.7	1.4	45.3
Texas	–	15	7	.6	9.3	.5	1.0	6.4	41.8	34.6	80.2	.7	.9	36.5
Virginia	E1	3	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Washington	–	5	3	.3	5.5	.2	.3	3.5	7.6	9.5	18.5	(D)	AA	(D)
Wisconsin	–	8	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1982 and 1977—Con.

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982											1977	
		All establishments[2]		All employees		Production workers							
	E[1]	Total (no.)	With 20 employees or more (no.)	Number[3] (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)	Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees[3] (1,000)	Value added by manufacture (million dollars)
INDUSTRY 3292, ASBESTOS PRODUCTS														
United States	-	96	53	9.7	179.8	7.4	14.6	126.6	397.4	429.3	842.8	31.3	13.9	439.3
California	-	13	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.5	68.3
Illinois	-	4	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.1	47.9
Indiana	-	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.8	17.8
Kentucky	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Louisiana	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Massachusetts	-	4	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	11.3
New Hampshire	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New Jersey	E4	9	6	.8	15.0	.6	1.3	11.0	48.5	41.1	90.9	4.5	1.1	30.3
New York	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.4	31.6
North Carolina	E3	6	5	.6	10.5	.5	1.0	7.7	26.7	20.7	47.7	.9	.9	28.2
Pennsylvania	-	12	7	2.0	42.2	1.5	3.0	29.8	98.0	111.6	208.5	8.6	1.9	53.4
Tennessee	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Texas	-	10	6	1.0	16.4	.9	1.7	12.9	49.8	59.3	111.2	2.5	.9	41.2
Virginia	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
INDUSTRY 3293, GASKETS, PACKING, AND SEALING DEVICES														
United States	-	473	241	30.3	495.4	21.8	41.5	307.9	997.6	661.6	1 666.0	53.0	33.0	748.3
Alabama	-	4	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	10.2
California	E1	71	30	3.1	53.1	2.3	4.5	31.8	101.0	58.2	159.6	4.1	3.0	61.7
Colorado	E2	6	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Connecticut	E1	12	7	.5	6.9	.4	.8	3.8	12.8	7.0	19.5	.2	.6	9.8
Florida	E1	7	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Georgia	E4	7	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois	-	46	27	6.0	104.7	4.6	8.5	69.0	152.5	139.1	294.4	10.4	7.1	160.0
Indiana	-	17	10	2.0	31.2	1.5	2.9	21.7	65.1	29.3	95.2	3.7	2.6	49.2
Kansas	-	5	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kentucky	-	4	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Massachusetts	-	21	12	1.1	19.4	.7	1.3	10.1	71.5	39.2	109.7	2.1	.8	39.8
Michigan	E1	25	14	1.1	19.1	.7	1.5	11.4	24.2	36.3	62.6	(D)	1.8	45.7
Minnesota	E2	8	4	.3	4.2	.2	.4	2.8	7.1	4.7	11.7	.9	.2	5.1
Missouri	E1	10	5	.4	5.5	.3	.6	3.7	10.3	11.9	22.1	(D)	.2	3.8
New Hampshire	-	3	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
New Jersey	E1	27	14	1.3	23.8	.9	1.8	14.8	50.5	25.6	78.4	2.6	1.1	35.2
New York	E1	26	12	1.7	25.7	1.1	2.1	13.6	50.3	29.5	81.3	2.8	1.8	44.6
North Carolina	-	8	6	.9	11.5	.5	1.0	5.8	29.4	17.9	48.1	2.3	.8	19.4
Ohio	E1	39	17	1.6	25.7	1.1	2.2	15.8	60.4	44.9	106.9	3.5	2.0	48.5
Oklahoma	-	10	5	.5	6.4	.4	.7	5.2	16.4	12.9	29.1	.7	(NA)	(NA)
Pennsylvania	-	24	11	.8	14.0	.5	1.0	8.4	28.8	17.9	46.6	(D)	.8	20.6
Rhode Island	-	4	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
South Carolina	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
South Dakota	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Tennessee	-	2	2	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Texas	E2	37	21	2.0	30.7	1.6	3.0	20.8	67.1	41.4	108.1	3.9	1.9	39.5
Utah	-	5	2	.3	5.4	.2	.4	2.6	12.7	4.6	17.0	.9	BB	(D)
Virginia	E1	6	5	.6	10.0	.4	.8	6.2	24.4	11.8	36.6	(D)	.6	13.0
Wisconsin	-	9	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.7	12.4
INDUSTRY 3295, MINERALS, GROUND OR TREATED														
United States	-	436	142	9.9	188.9	7.4	14.3	128.6	637.4	617.1	1 256.5	71.7	11.5	479.4
Alabama	-	11	3	.2	2.7	.1	.2	1.7	7.9	9.7	18.1	.4	.3	7.4
Arkansas	-	12	7	.5	10.6	.4	.8	7.1	58.0	32.7	91.5	(D)	.4	24.1
California	-	36	14	1.3	27.4	.9	1.8	18.0	105.0	87.8	193.8	14.0	1.2	55.6
Colorado	-	15	4	.2	4.0	.2	.3	2.6	12.7	6.1	18.8	.3	(NA)	(NA)
Florida	E1	13	4	.3	5.0	.2	.4	3.4	17.7	17.4	36.1	.4	.2	7.5
Georgia	E1	9	4	.3	4.8	.3	.5	3.6	14.6	16.1	31.0	2.8	.7	24.2
Illinois	-	21	8	.4	7.5	.3	.6	4.8	19.9	24.1	44.5	2.2	.4	16.3
Indiana	-	7	2	.3	5.2	.2	.4	3.7	15.6	9.3	24.0	.6	.3	10.8
Kansas	E7	6	2	.2	1.6	.1	.2	1.1	5.6	4.5	10.1	(D)	(NA)	(NA)
Louisiana	-	16	10	.5	9.2	.4	.7	6.5	36.8	88.7	121.4	5.5	.5	43.1
Maryland	-	5	4	.3	4.9	.2	.4	3.8	14.8	8.5	21.4	1.7	.2	11.4
Michigan	-	11	3	.2	4.9	.1	.3	2.6	13.1	36.2	49.4	.3	.7	42.0
Mississippi	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Missouri	-	12	5	.4	6.8	.3	.6	4.8	21.0	13.2	37.5	(D)	.3	10.9
New Jersey	-	18	9	.5	10.2	.3	.6	5.4	27.2	40.4	67.3	1.2	.6	18.1
New York	E1	11	3	.3	7.0	.2	.4	4.1	18.8	11.4	29.4	(D)	.5	17.9
North Carolina	E4	14	2	.2	2.8	.1	.3	1.8	9.7	6.9	16.6	1.2	.2	4.1
Ohio	-	29	5	.4	7.5	.3	.5	5.5	22.8	18.9	41.7	2.8	.8	30.8
Oregon	E2	13	2	.2	5.4	.2	.3	3.5	14.3	9.8	24.1	4.1	.3	9.5
Pennsylvania	E1	39	14	.8	13.3	.6	1.1	9.9	44.9	21.3	66.4	3.3	1.2	40.2
South Carolina	E4	6	4	.2	3.1	.1	.2	1.6	6.7	6.1	12.8	(D)	.2	3.2
Tennessee	-	8	3	.2	3.9	.1	.3	2.3	7.4	9.0	17.9	(D)	.2	7.8
Texas	E1	32	11	.6	11.6	.5	1.1	8.6	43.1	55.9	96.8	4.1	.6	16.3
Virginia	E1	8	3	.2	2.3	.1	.2	1.4	7.1	9.5	16.7	.3	AA	(D)
West Virginia	-	10	4	.3	4.8	.2	.3	3.7	14.7	4.7	19.6	(D)	.2	9.0
Wisconsin	-	6	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	12.5

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1982 and 1977—Con.

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982											1977	
		All establishments[2]		All employees		Production workers							
	E[1]	Total (no.)	With 20 employees or more (no.)	Number[3] (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)	Value added by manufacture[4] (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees[3] (1,000)	Value added by manufacture (million dollars)
INDUSTRY 3296, MINERAL WOOL													
United States	-	**179**	**94**	**19.7**	**438.9**	**15.5**	**31.9**	**334.2**	**1 236.7**	**1 041.5**	**2 281.1**	**67.0**	**22.6**	**1 053.7**
Alabama	-	8	4	.5	10.8	.4	.9	8.0	23.9	35.4	59.3	.4	.3	9.1
California	-	16	7	1.8	42.2	1.4	2.9	32.2	144.2	105.4	251.7	4.9	1.5	96.9
Florida	-	6	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Georgia	-	7	6	1.3	27.0	.9	1.9	18.5	122.7	85.6	207.8	7.2	1.1	86.2
Illinois	E1	6	4	.4	10.0	.3	.7	7.1	14.6	17.9	35.7	(D)	.6	24.6
Indiana	-	11	8	1.4	29.4	1.0	2.4	19.8	78.3	62.5	139.0	4.6	1.9	69.5
Kansas	-	6	4	1.9	50.7	1.5	3.2	40.7	158.0	137.8	292.1	7.3	FF	(D)
Michigan	-	5	3	.4	5.8	.3	.5	4.1	11.3	20.9	33.0	1.3	BB	(D)
Minnesota	E9	5	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Mississippi	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Missouri	E4	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
New Jersey	-	11	9	2.2	53.6	1.7	3.5	38.7	126.7	111.9	243.4	6.2	2.6	122.9
New York	-	7	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Ohio	-	16	11	3.5	83.2	2.9	5.9	68.0	209.2	162.2	369.6	13.1	3.9	152.1
Pennsylvania	-	17	8	1.5	32.3	1.2	2.4	25.3	81.6	57.7	139.1	8.3	1.7	69.2
Tennessee	E2	4	4	.2	3.0	.2	.3	2.2	5.1	8.7	13.8	(D)	(NA)	(NA)
Texas	-	14	4	1.2	24.5	.9	2.0	18.8	82.3	76.5	159.9	2.4	1.3	83.5
West Virginia	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
INDUSTRY 3297, NONCLAY REFRACTORIES														
United States	-	**119**	**66**	**6.8**	**148.4**	**4.6**	**8.7**	**93.0**	**333.1**	**343.3**	**691.0**	**48.5**	**9.1**	**352.1**
Illinois	-	7	5	.2	4.4	.2	.3	3.1	12.7	10.8	22.8	.6	.3	9.2
Indiana	-	5	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Kentucky	-	5	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Maryland	-	4	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Michigan	-	5	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Mississippi	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
New York	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Ohio	-	26	12	1.8	41.0	1.2	2.2	24.1	82.2	87.1	178.0	28.0	1.4	61.0
Pennsylvania	-	22	15	1.4	30.8	1.0	1.8	20.8	64.4	56.7	124.7	2.4	2.4	93.6
West Virginia	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.														
United States	E2	**583**	**67**	**6.5**	**94.5**	**4.8**	**10.0**	**63.9**	**240.3**	**177.7**	**422.3**	**38.3**	**7.7**	**224.1**
California	E4	94	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.9	27.2
Colorado	E1	17	4	.3	4.4	.2	.5	3.4	8.8	7.6	16.6	.2	.2	6.0
Florida	E5	47	2	.3	3.8	.2	.5	2.6	12.2	9.9	22.0	.5	.2	4.8
Illinois	E4	24	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	8.7
Louisiana	-	9	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	7.6
Mississippi	-	8	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	10.9
Missouri	E1	20	1	.2	4.1	.2	.4	3.2	6.6	4.7	12.2	(D)	.2	4.0
New Hampshire	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New Jersey	E1	23	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.1	27.3
New York	E1	42	7	1.0	15.5	.8	1.5	10.5	55.7	23.5	80.4	(D)	1.0	30.4
Ohio	E5	22	5	.4	6.9	.4	.7	4.7	14.3	11.7	26.1	.3	.9	25.3
Pennsylvania	E1	30	5	.4	7.5	.3	.7	4.9	20.7	11.0	31.8	(D)	.3	6.8
Texas	E1	50	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Virginia	-	7	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	7.8
Washington	E9	11	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	9.3

Note: For qualifications of data, see footnotes on table 1a.

[1]Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at time data were tabulated. The following symbols are shown for those States where estimated data based on administrative records data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

[2]Includes establishments with payroll at any time during year.

[3]Statistics for some producing States have been withheld to avoid disclosing data for individual companies. However, for States with 150 employees or more, number of establishments is shown and employment size range is indicated by one of the following symbols: AA—150 to 249 employees; BB—250 to 499 employees; CC—500 to 999 employees; EE—1,000 to 2,499 employees; FF—2,500 employees or more.

[4]Beginning in 1982, all respondents were requested to report their inventories at cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, data for inventories and value added by manufacture are not comparable to prior-year data.

Table 3a. **Summary Statistics for the Industry: 1982**

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Gaskets, packing and sealing devices (SIC 3293)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)
Companies[1] ---- number	326	77	409	279	132	76	569
All establishments[2] ---- do	374	96	473	436	179	119	583
With 1 to 19 employees ---- do	197	43	232	294	85	53	516
With 20 to 99 employees ---- do	132	22	167	125	43	44	56
With 100 employees or more ---- do	45	31	74	17	51	22	11
All employees:							
Average for year ---- 1,000	26.0	9.7	30.3	9.9	19.7	6.8	6.5
Annual payroll[3] ---- mil. dol.	531.8	179.8	495.4	188.9	438.9	148.4	94.5
Production workers:							
Average for year ---- 1,000	17.0	7.4	21.8	7.4	15.5	4.6	4.8
March ---- do	18.1	7.8	23.3	7.7	15.5	5.4	4.8
May ---- do	17.2	7.8	22.6	7.7	15.1	4.9	5.1
August ---- do	16.6	7.2	21.6	7.4	15.5	4.0	4.7
November ---- do	15.9	6.8	19.8	6.9	15.9	3.8	4.8
Hours ---- millions	31.6	14.6	41.5	14.3	31.9	8.7	10.0
January to March ---- do	8.7	3.7	10.9	3.6	7.8	2.6	2.5
April to June ---- do	8.2	3.8	10.8	3.8	7.7	2.4	2.5
July to September ---- do	7.3	3.6	10.1	3.6	8.1	1.8	2.4
October to December ---- do	7.4	3.5	9.6	3.4	8.3	1.8	2.5
Wages ---- mil. dol.	305.1	126.6	307.9	128.6	334.2	93.0	63.9
Value added by manufacture[4] ---- do	1 451.8	397.4	997.6	637.4	1 236.7	333.1	240.3
Cost of materials, etc.[5] ---- do	1 277.2	429.3	661.6	617.1	1 041.5	343.3	177.7
Materials, parts, containers, etc., consumed ---- do	1 033.9	381.3	569.1	502.9	733.5	277.8	139.2
Resales ---- do	159.2	11.9	37.2	10.0	57.9	4.8	5.1
Fuels consumed[6] ---- do	37.0	16.4	13.2	61.6	144.4	39.2	23.1
Purchased electric energy[7] ---- do	36.2	19.2	25.3	35.3	101.3	19.6	9.6
Contract work ---- do	10.8	.5	16.8	7.2	4.5	1.9	.7
Value of shipments, including resales ---- do	2 750.7	842.8	1 666.0	1 256.5	2 281.1	691.0	422.3
Value of resales ---- do	285.7	15.4	59.9	13.5	62.5	6.3	6.4
Manufacturers' inventories (see tables 3b and 3c)							
Capital expenditures for plant and equipment[8] ---- do	103.7	40.5	60.1	75.3	71.4	65.0	38.9
New capital expenditures ---- do	96.9	31.3	53.0	71.7	67.0	48.5	38.3
New buildings and other structures ---- do	17.4	5.7	5.6	12.7	12.7	6.8	4.4
New machinery and equipment ---- do	79.5	25.6	47.5	59.1	54.4	41.7	33.9
Used capital expenditures ---- do	6.9	9.2	7.2	3.7	4.4	16.5	.7
Primary product specialization ratio[9] ---- percent	83	92	93	98	97	86	95
Coverage ratio[10] ---- do	95	91	89	93	97	82	87

[1]For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.
[2]Includes establishments with payroll at any time during year.
[3]Data on supplemental labor costs are not included in annual payroll, but are shown in table 3d.
[4]Value added by manufacture is computed using inventory data reported on a cost or market basis prior to any adjustment to LIFO cost. See table 3b, footnote 1 for further explanation.
[5]Data on purchased services for the repair of buildings and machinery and for communication services are not included in cost of materials, etc., but are shown in table 3d.
[6]Data on purchased fuels by type were not collected for 1982. See MC82-S-4, Fuels and Electric Energy Consumed, for 1981 data on purchased fuels by type.
[7]Data on quantity of electric energy used for heat and power are included in table 3d.
[8]Data on capital expenditures for new machinery and equipment by type, depreciable assets, retirements, rental payments, and depreciation are included in table 3d.
[9]Represents ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for establishments classified in industry.
[10]Represents ratio of primary products shipped by establishments classified in industry to total shipments of such products by all manufacturing establishments, wherever classified.

Table 3b. **Value of Inventories for the Industry: End of 1981 and 1982**

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)		Asbestos products (SIC 3292)		Gaskets, packing and sealing devices (SIC 3293)		Minerals, ground or treated (SIC 3295)	
	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982
Total inventories[1] ----	**608.3**	**563.1**	**174.8**	**148.0**	**355.1**	**339.0**	**196.2**	**192.0**
Detail by method of valuation:								
Subject to LIFO costing[2] ----	258.4	234.8	51.1	42.9	130.2	131.2	43.0	54.0
LIFO reserve ----	76.7	81.8	12.1	10.4	27.2	31.6	11.2	14.1
LIFO value ----	181.7	153.0	39.0	32.5	102.9	99.6	31.8	39.9
Not subject to LIFO costing ----	287.7	276.0	117.9	99.8	169.3	160.1	111.5	98.9
Valuation method not reported[3] ----	60.8	51.1	5.8	5.3	51.2	46.7	39.8	34.4
Amount subject to LIFO reported without associated reserve and value[4] ----	1.4	1.2	–	–	4.3	1.0	2.0	4.8
Detail by stage of fabrication:								
Finished goods ----	278.4	275.9	100.4	86.3	151.5	153.2	58.3	53.5
Work in process ----	184.1	164.8	25.9	24.1	83.1	74.5	26.7	29.4
Materials and supplies ----	145.9	122.5	48.5	37.6	120.5	111.2	111.1	109.1

See footnotes at end of table.

Table 3b. Value of Inventories for the Industry: End of 1981 and 1982—Con.

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Mineral wool (SIC 3296)		Nonclay refractories (SIC 3297)		Nonmetallic mineral products, n.e.c. (SIC 3299)	
	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982
Total inventories[1]	199.2	180.1	250.7	222.9	68.0	60.6
Detail by method of valuation:						
Subject to LIFO costing[2]	43.7	40.0	93.9	62.6	2.9	2.9
LIFO reserve	16.0	16.9	44.5	27.5	.7	.8
LIFO value	27.7	23.1	49.3	35.1	2.2	2.1
Not subject to LIFO costing	136.4	125.9	133.2	121.8	42.4	35.4
Valuation method not reported[3]	16.2	13.3	16.6	15.0	22.7	22.2
Amount subject to LIFO reported without associated reserve and value[4]	2.9	.9	7.0	23.5	-	-
Detail by stage of fabrication:						
Finished goods	103.2	101.5	103.4	92.5	29.7	26.9
Work in process	12.0	10.8	24.7	20.9	14.4	12.9
Materials and supplies	84.0	67.8	122.6	109.4	24.0	20.8

[1]Effective with the 1982 Economic Censuses, uniform instructions for reporting inventories were introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (LIFO, FIFO, market, to name a few). In 1982, all respondents were requested to report inventories at cost or market. LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve. For further explanation, see inventories in appendixes.

[2]Only includes data reported by respondents who (a) indicated amount of inventories subject to LIFO cost, and (b) provided sufficient information to determine associated LIFO reserve and value figures.

[3]Includes data estimated for nonresponse and nonmail administrative records and data reported by respondents who provided total inventory figures without other information.

[4]Includes data reported by respondents who indicated their inventories were subject to LIFO cost, but did not provide associated LIFO reserve and value figures.

Table 3c. Inventories by Specific Method of Valuation for the Industry: End of 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)		Asbestos products (SIC 3292)		Gaskets, packing and sealing devices (SIC 3293)		Minerals, ground or treated (SIC 3295)	
	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)
Total inventories	100.0	(X)	100.0	(X)	100.0	(X)	100.0	(X)
Last-In, First-Out (LIFO) methods	41.7	(X)	29.0	(X)	38.7	(X)	28.1	(X)
Non-LIFO methods	49.0	(X)	67.5	(X)	47.2	(X)	51.5	(X)
Cost basis:								
First-In, First-Out (FIFO)	42.1	1.0	21.4	2.5	16.7	2.5	28.0	3.5
Average cost	.9	.2	12.9	5.2	2.6	1.0	7.2	1.1
Specific or actual cost	(S)	(S)	(S)	(S)	8.4	.9	5.8	2.4
Standard cost	4.8	.8	32.9	3.5	17.1	1.8	10.3	2.1
Other	(S)	(S)	(Z)	(Z)	(S)	(S)	(S)	(S)
Market basis:								
Market lower than cost	(Z)	(Z)	(Z)	(Z)	(Z)	(Z)	(Z)	(Z)
Market always used	(Z)	(Z)	(S)	(S)	(Z)	(Z)	(Z)	(Z)
Valuation method not reported	9.1	(X)	3.6	(X)	13.8	(X)	17.9	(X)
Amount subject to LIFO reported without associated reserve and value	.2	(X)	(Z)	(X)	.3	(X)	2.5	(X)

Item	Mineral wool (SIC 3296)		Nonclay refractories (SIC 3297)		Nonmetallic mineral products, n.e.c. (SIC 3299)	
	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)
Total inventories	100.0	(X)	100.0	(X)	100.0	(X)
Last-In, First-Out (LIFO) methods	22.2	(X)	28.1	(X)	4.8	(X)
Non-LIFO methods	69.9	(X)	54.7	(X)	58.5	(X)
Cost basis:						
First-In, First-Out (FIFO)	44.3	1.6	23.8	6.5	(S)	(S)
Average cost	.7	.3	5.8	1.4	8.8	3.6
Specific or actual cost	2.5	.1	.1	(Z)	4.7	2.2
Standard cost	22.1	1.4	25.0	6.1	38.3	6.1
Other	(Z)	(Z)	(Z)	(Z)	(S)	(S)
Market basis:						
Market lower than cost	.2	(Z)	(Z)	(Z)	(Z)	(Z)
Market always used	(Z)	(Z)	(Z)	(Z)	(S)	(S)
Valuation method not reported	7.4	(X)	6.7	(X)	36.7	(X)
Amount subject to LIFO reported without associated reserve and value	.5	(X)	10.6	(X)	(Z)	(X)

Note: The percentages shown for the LIFO and non-LIFO totals and the categories "valuation method not reported" and "amount subject to LIFO reported..." are based on the census universe estimates included in table 3b. The percentages shown for the specific non-LIFO methods of valuation (e.g., FIFO, etc.) are based on a representative sample of establishments included in the annual survey of manufactures (ASM) panel for 1982 (see appendixes for description of ASM). The absolute standard error of each of the ASM estimates is shown above.

Table 3d. Supplemental Industry Statistics Based on Sample Estimates: 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Abrasive products (SIC 3291)		Asbestos products (SIC 3292)		Gaskets, packing and sealing devices (SIC 3293)		Minerals, ground or treated (SIC 3295)	
	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)
Supplemental labor costs:								
Total	148.4	2	42.4	7	120.0	2	44.8	5
Legal costs	49.2	2	18.9	8	48.9	2	19.0	3
Voluntary costs	99.2	2	23.5	7	71.1	3	25.9	7
Purchased services:								
Cost of purchased services for the repair of—								
Buildings and other structures	3.0	15	1.7	2	2.0	8	.7	23
Response coverage ratio (percent)[2]	89.5	(X)	67.3	(X)	73.3	(X)	65.1	(X)
Machinery	15.3	8	7.5	15	8.9	6	6.8	24
Response coverage ratio (percent)[2]	91.1	(X)	66.5	(X)	79.3	(X)	72.8	(X)
Cost of purchased communication services	24.9	3	2.0	9	5.3	8	1.8	23
Response coverage ratio (percent)[2]	88.9	(X)	63.6	(X)	70.5	(X)	77.2	(X)
Electric energy used for heat and power:								
Purchased:								
Quantity (million kWh)	863.2	4	360.8	1	487.9	8	634.5	2
Cost	36.2	(X)	19.2	(X)	25.3	(X)	35.3	(X)
Generated less sold (million kWh)	23.5	1	–	–	.3	1	–	–
Gross book value of depreciable assets:								
Total:								
Beginning of year	932.0	3	377.7	4	677.5	5	791.2	8
New capital expenditures	99.0	6	32.9	8	50.0	11	47.7	17
Used capital expenditures	5.5	2	8.5	1	11.9	52	8.0	58
Retirements	77.8	19	34.5	5	21.8	14	13.9	20
End of year	958.7	3	384.6	4	717.6	6	833.0	8
Buildings and other structures:								
Beginning of year	268.6	4	85.7	4	167.2	7	133.2	7
New capital expenditures	17.4	6	5.1	13	5.6	18	9.4	12
Used capital expenditures	3.2	1	1.1	1	2.5	53	1.2	91
Retirements	18.7	21	6.7	3	2.9	33	3.5	34
End of year	270.5	4	85.3	4	172.3	7	140.2	7
Machinery and equipment:								
Beginning of year	663.4	3	291.9	5	510.4	5	658.0	9
New capital expenditures	81.6	6	27.8	8	44.4	11	38.4	19
Automobiles, trucks, etc., for highway use	1.4	38	1.1	85	.7	30	1.0	15
Computers and peripheral data processing equipment	1.5	20	.4	1	1.2	5	.3	57
All other	72.3	5	23.7	7	33.4	6	27.8	9
New machinery and equipment, n.s.k.[3]	6.4	(S)	2.6	(S)	9.1	(S)	9.3	(S)
Used capital expenditures	2.3	3	7.4	1	9.4	52	6.8	55
Retirements	59.1	18	27.8	5	18.9	12	10.4	21
End of year	688.2	3	299.3	5	545.3	6	692.7	9
Rental payments:								
Total	31.9	6	3.2	16	18.1	9	2.5	22
Buildings and other structures	12.3	14	1.4	35	8.3	15	1.1	39
Machinery and equipment	19.6	2	1.8	5	9.8	11	1.4	18
Depreciation charges during 1982:								
Total	66.2	3	22.2	5	54.3	4	53.8	8
Buildings and other structures	15.3	3	3.1	14	8.4	6	5.4	8
Machinery and equipment	50.9	3	19.1	5	45.9	5	48.4	8

Item	Mineral wool (SIC 3296)		Nonclay refractories (SIC 3297)		Nonmetallic mineral products, n.e.c. (SIC 3299)	
	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)
Supplemental labor costs:						
Total	111.7	1	46.2	3	18.6	16
Legal costs	42.5	1	16.3	5	8.6	6
Voluntary costs	69.3	2	29.8	6	10.0	29
Purchased services:						
Cost of purchased services for the repair of—						
Buildings and other structures	3.3	24	1.1	41	.4	48
Response coverage ratio (percent)[2]	92.2	(X)	95.9	(X)	20.4	(X)
Machinery	18.4	3	4.8	38	1.6	55
Response coverage ratio (percent)[2]	90.5	(X)	87.9	(X)	21.1	(X)
Cost of purchased communication services	2.8	16	2.2	26	1.4	54
Response coverage ratio (percent)[2]	89.2	(X)	91.3	(X)	21.8	(X)
Electric energy used for heat and power:						
Purchased:						
Quantity (million kWh)	2 420.0	1	334.5	7	203.6	6
Cost	101.3	(X)	19.6	(X)	9.6	(X)
Generated less sold (million kWh)	1.9	1	–	–	–	–
Gross book value of depreciable assets:						
Total:						
Beginning of year	1 389.5	2	538.6	6	307.4	9
New capital expenditures	64.0	5	71.4	38	63.6	50
Used capital expenditures	5.8	27	40.5	77	.1	79
Retirements	76.1	29	30.3	25	91.9	5
End of year	1 383.2	2	620.2	12	279.2	16

See footnotes at end of table.

Table 3d. Supplemental Industry Statistics Based on Sample Estimates: 1982—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Mineral wool (SIC 3296)		Nonclay refractories (SIC 3297)		Nonmetallic mineral products, n.e.c. (SIC 3299)	
	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)	Amount (million dollars)	Relative standard error of estimate[1] (percent)
Gross book value of depreciable assets—Con.						
Buildings and other structures:						
Beginning of year	345.1	4	138.7	16	91.9	11
New capital expenditures	12.7	5	9.4	34	5.0	34
Used capital expenditures	2.6	61	1.2	65	-	-
Retirements	20.8	46	4.9	34	20.1	2
End of year	339.7	2	144.4	17	76.8	14
Machinery and equipment:						
Beginning of year	1 044.3	2	400.0	5	215.6	10
New capital expenditures	51.3	6	62.0	40	58.6	51
Automobiles, trucks, etc., for highway use	.3	41	.5	52	.3	70
Computers and peripheral data processing equipment	.3	10	.1	1	1.6	70
All other	33.5	5	61.3	40	45.0	63
New machinery and equipment, n.s.k.[3]	17.2	(S)	.1	(S)	11.7	(S)
Used capital expenditures	3.2	1	39.3	78	.1	79
Retirements	55.3	24	25.4	24	71.8	6
End of year	1 043.5	2	475.9	15	202.4	18
Rental payments:						
Total	10.4	6	3.6	23	5.4	43
Buildings and other structures	3.2	9	.7	8	3.0	44
Machinery and equipment	7.1	5	3.0	28	2.4	62
Depreciation charges during 1982:						
Total	88.5	2	32.7	14	16.5	12
Buildings and other structures	17.0	1	6.3	28	3.4	13
Machinery and equipment	71.5	2	26.4	13	13.2	14

Note: Data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used expenditures are also shown in table 3a. Data in table 3a are census universe totals and may differ from annual survey of manufactures (ASM) sample estimates shown in this table. Data in this table represent best estimates of year-to-year change as measured by the continuing ASM sample. However, they are subject to sampling error and, hence, as estimates of level, are not as reliable as universe figures shown in table 3a.

[1]For description of relative standard error of estimate, see Qualifications of the Data in appendixes.
[2]Measure of extent to which respondents reported each item. Derived for each item by calculating the ratio of weighted employment for those sample establishments that reported the specific inquiry to weighted total employment for all sample establishments classified in industry. (See appendixes for explanation of sample weight.)
[3]Represents total machinery and equipment expenditures for establishments that did not break down their expenditures by specific type.

Table 4. Industry Statistics by Employment Size of Establishment: 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E[1]	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3291, ABRASIVE PRODUCTS												
Total	-	**374**	**26.0**	**531.8**	**17.0**	**31.6**	**305.1**	**1 451.8**	**1 277.2**	**2 750.7**	**96.9**	**563.1**
Establishments with an average of—												
1 to 4 employees	E8	68	.1	1.8	.1	.2	1.2	5.8	4.3	10.2	.3	1.9
5 to 9 employees	E8	45	.3	5.1	.2	.4	2.9	14.5	10.7	25.5	.5	4.6
10 to 19 employees	E6	84	1.2	20.2	.8	1.5	11.7	50.6	39.7	91.3	1.5	16.4
20 to 49 employees	E2	88	2.9	51.6	2.0	3.8	28.4	116.7	90.7	208.4	4.8	35.5
50 to 99 employees	-	44	3.2	55.6	2.3	4.4	34.0	127.1	128.0	257.9	4.4	41.8
100 to 249 employees	E1	26	3.7	63.3	2.5	4.8	37.9	150.5	153.3	303.3	14.2	65.9
250 to 499 employees	-	12	4.2	82.9	3.1	5.7	53.2	271.6	306.6	585.5	13.6	84.4
500 to 999 employees	-	3	10.4	251.2	5.9	10.8	135.9	715.0	543.9	1 268.6	57.7	312.5
1,000 to 2,499 employees	-	3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
2,500 employees or more	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records[2]	E9	134	1.0	14.4	.7	1.3	8.4	42.3	29.8	73.1	1.3	14.3
INDUSTRY 3292, ASBESTOS PRODUCTS												
Total	-	96	**9.7**	**179.8**	**7.4**	**14.6**	**126.6**	**397.4**	**429.3**	**842.8**	**31.3**	**148.0**
Establishments with an average of—												
1 to 4 employees	E9	16	(Z)	.3	(Z)	.1	.3	.9	.9	1.8	(Z)	.4
5 to 9 employees	E7	9	.1	.7	(Z)	.1	.5	2.1	1.4	3.6	.1	.7
10 to 19 employees	E6	18	.2	3.6	.2	.3	2.5	6.2	7.9	15.9	.6	2.8
20 to 49 employees	E1	14	.4	7.2	.3	.7	5.1	16.1	13.3	31.8	1.1	4.2
50 to 99 employees	-	8	.6	8.9	.5	1.0	6.8	19.3	16.2	36.2	.6	6.9
100 to 249 employees	E1	18	2.7	49.1	2.0	3.9	33.0	125.2	130.5	262.5	10.4	40.2
250 to 499 employees	-	9	3.1	53.9	2.5	5.0	40.7	132.3	129.8	267.8	11.5	52.1
500 to 999 employees	-	4	2.6	56.1	1.9	3.6	37.6	95.3	129.3	223.2	7.0	40.6
Covered by administrative records[2]	E9	24	.2	2.7	.2	.3	2.0	6.2	6.8	13.2	.4	2.7

See footnotes at end of table.

Table 4. Industry Statistics by Employment Size of Establishment: 1982—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E[1]	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3293, GASKETS, PACKING, AND SEALING DEVICES												
Total	-	473	30.3	495.4	21.8	41.5	307.9	997.6	661.6	1 666.0	53.0	339.0
Establishments with an average of—												
1 to 4 employees	E9	80	.2	2.9	.1	.3	1.9	7.4	5.3	12.8	.3	2.4
5 to 9 employees	E7	59	.4	5.8	.3	.6	3.5	14.8	11.3	26.4	.5	4.9
10 to 19 employees	E4	93	1.3	21.9	.9	1.7	11.1	46.1	42.3	88.8	1.6	13.8
20 to 49 employees	E2	109	3.4	53.4	2.4	4.6	29.8	114.3	94.7	209.5	4.9	31.6
50 to 99 employees	E1	58	4.1	64.6	3.0	5.7	40.2	128.6	102.4	233.2	5.7	36.5
100 to 249 employees	-	49	8.0	127.9	5.8	11.2	80.6	315.0	175.2	490.1	17.8	92.3
250 to 499 employees	-	18	6.7	113.9	4.7	8.8	71.9	203.4	131.1	338.0	12.8	76.4
500 to 999 employees	-	6	6.2	105.0	4.6	8.7	68.9	168.0	99.3	267.2	9.5	81.0
1,000 to 2,499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records[2]	E9	136	1.0	12.6	.7	1.3	8.0	29.4	21.7	51.8	1.7	10.5
INDUSTRY 3295, MINERALS, GROUND OR TREATED												
Total	-	436	9.9	188.9	7.4	14.3	128.6	637.4	617.1	1 256.5	71.7	192.0
Establishments with an average of—												
1 to 4 employees	E5	86	.2	3.0	.1	.3	2.3	11.5	9.2	20.8	.8	3.3
5 to 9 employees	E3	89	.6	9.7	.5	.9	6.8	33.2	36.8	71.5	3.4	10.2
10 to 19 employees	E1	119	1.7	30.2	1.3	2.5	21.1	90.1	105.2	196.3	9.6	28.4
20 to 49 employees	-	94	2.9	52.8	2.1	4.0	35.2	172.8	199.4	365.5	16.6	62.8
50 to 99 employees	-	31	2.1	38.2	1.6	3.0	26.1	128.7	133.6	266.7	5.3	42.7
100 to 249 employees	-	16	2.4	55.0	1.8	3.5	37.1	201.1	132.9	335.8	36.0	44.7
250 to 499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records[2]	E9	64	.3	3.2	.2	.4	2.2	11.6	9.5	21.2	.9	3.3
INDUSTRY 3296, MINERAL WOOL												
Total	-	179	19.7	438.9	15.5	31.9	334.2	1 236.7	1 041.5	2 281.1	67.0	180.1
Establishments with an average of—												
1 to 4 employees	E8	33	(Z)	.6	(Z)	.1	.5	1.7	1.3	2.9	.1	.5
5 to 9 employees	E6	24	.2	2.3	.1	.3	1.7	7.9	5.3	13.3	.3	1.1
10 to 19 employees	E3	28	.4	6.2	.3	.6	3.7	16.0	16.8	32.8	1.1	3.3
20 to 49 employees	E3	30	.9	14.7	.7	1.4	10.0	34.4	41.8	76.4	2.2	7.9
50 to 99 employees	E2	13	.9	15.3	.7	1.4	10.1	36.1	46.4	82.3	2.1	9.0
100 to 249 employees	-	24	3.7	78.8	3.0	6.0	59.2	156.9	176.2	335.8	11.2	32.6
250 to 499 employees	-	18	6.0	134.8	4.7	9.6	102.6	446.3	342.2	794.4	18.0	50.7
500 to 999 employees	-	8	7.5	186.2	6.0	12.5	146.3	537.4	411.5	943.1	32.0	75.2
1,000 to 2,499 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records[2]	E9	50	.4	4.7	.3	.7	3.6	12.5	9.6	22.2	.7	1.8
INDUSTRY 3297, NONCLAY REFRACTORIES												
Total	-	119	6.8	148.4	4.6	8.7	93.0	333.1	343.3	691.0	48.5	222.9
Establishments with an average of—												
1 to 4 employees	E9	23	(Z)	.7	(Z)	.1	.5	1.7	1.3	3.0	.1	.9
5 to 9 employees	E2	12	.1	1.2	.1	.1	.8	4.2	4.6	8.8	.1	2.3
10 to 19 employees	E4	18	.3	3.9	.2	.4	2.9	8.7	8.6	17.6	.4	4.2
20 to 49 employees	-	27	.9	15.7	.6	1.2	10.1	39.4	30.7	70.1	2.5	16.8
50 to 99 employees	-	17	1.3	27.4	.9	1.6	17.4	69.6	78.3	147.6	3.9	59.6
100 to 249 employees	-	17	2.7	65.7	1.9	3.7	42.1	143.8	166.2	323.0	27.0	107.1
250 to 499 employees	-	5	1.5	33.7	.9	1.6	19.1	65.6	53.6	120.8	14.5	32.1
Covered by administrative records[2]	E9	31	.3	3.4	.2	.4	2.3	7.8	7.3	15.3	.3	4.8
INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.												
Total	E2	583	6.5	94.5	4.8	10.0	63.9	240.3	177.7	422.3	38.3	60.6
Establishments with an average of—												
1 to 4 employees	E9	342	.6	6.6	.4	1.0	5.3	14.6	12.4	27.3	.9	4.5
5 to 9 employees	E7	98	.6	7.2	.5	1.0	5.2	15.7	12.0	27.6	.6	5.4
10 to 19 employees	E2	76	1.0	13.0	.8	1.6	8.6	35.8	24.5	60.2	2.1	7.7
20 to 49 employees	E1	47	1.4	21.4	1.0	2.2	13.2	46.7	44.5	93.3	2.3	15.9
50 to 99 employees	E2	9	.6	8.8	.5	1.0	5.6	22.4	11.6	33.7	3.8	4.6
100 to 249 employees	E1	10	2.1	37.5	1.6	3.2	26.0	105.2	72.6	180.2	28.7	22.5
500 to 999 employees	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records[2]	E9	342	.9	7.9	.6	1.4	6.1	16.7	14.7	31.9	.8	5.4

Note: For qualifications of data, see footnotes on table 1a. Data shown as a (D) are included in underscored figures above.

[1]Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administretive records of other government egencies rather than from census report forms. These date were then used in conjunction with industry evereges to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at time deta were tabuleted. The following symbols are shown for those Stetes where estimated data based on administrative records data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

[2]Report forms were not mailed to small single-unit companies with up to 20 employees (cutoff varied by industry). Peyroll end seles data for 1982 were obteined from administrative records supplied by other egencies of the Federal Government. Those data were then used in conjunction with industry everages to estimete the items shown. Dete ere elso included in respective size classes shown.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1982

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. Statistics for establishments with specialization ratios of less than 75 percent are included in total lines but are not shown as a separate class. In addition, data may not be shown for various reasons; e.g., to avoid disclosing data for individual companies. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes.]

Industry or product class code	Industry or product class by percent of specialization	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3291	**Abrasive products:**										
	Entire industry	374	26.0	531.8	17.0	31.6	305.1	1 451.8	1 277.2	2 750.7	96.9
	Establishments with 75 percent specialization or more	362	22.0	437.2	14.3	26.0	238.6	1 022.9	876.4	1 928.5	83.1
32915	Nonmetallic sized grains, powders, and flour abrasive:										
	Establishments with this product class primary	32	3.3	72.5	2.1	3.6	36.8	193.4	189.8	382.0	24.9
	Establishments with 75 percent specialization or more in class	30	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32916	Nonmetallic abrasive products:										
	Establishments with this product class primary	114	11.1	227.0	6.8	12.4	116.0	445.9	244.0	711.1	42.6
	Establishments with 75 percent specialization or more in class	105	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32917	Nonmetallic coated abrasive products:										
	Establishments with this product class primary	43	8.5	179.7	5.9	11.4	119.1	648.8	713.0	1 361.4	24.6
	Establishments with 75 percent specialization or more in class	36	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32918	Metal abrasives, including scouring pads:										
	Establishments with this product class primary	22	1.7	32.6	1.3	2.5	21.6	106.7	89.8	197.4	3.0
	Establishments with 75 percent specialization or more in class	20	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3292	**Asbestos products:**										
	Entire industry	96	9.7	179.8	7.4	14.6	126.6	397.4	429.3	842.8	31.3
	Establishments with 75 percent specialization or more	86	8.4	154.0	6.5	13.0	109.7	342.4	376.5	731.7	28.0
32922	Asbestos friction materials:										
	Establishments with this product class primary	22	4.3	81.8	3.1	5.8	53.9	151.7	128.7	284.1	13.6
	Establishments with 75 percent specialization or more in class	17	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32928	Asphalt and vinyl asbestos floor tile:										
	Establishments with this product class primary	7	2.3	42.7	1.9	4.2	33.6	128.9	173.5	301.0	12.4
	Establishments with 75 percent specialization or more in class	7	2.3	42.7	1.9	4.2	33.6	128.9	173.5	301.0	12.4
32929	Asbestos textiles, asbestos insulation, and asbestos-cement products:										
	Establishments with this product class primary	27	2.7	50.5	2.1	4.0	35.5	106.3	117.1	237.0	4.9
	Establishments with 75 percent specialization or more in class	24	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3293	**Gaskets, packing, and sealing devices:**										
	Entire industry	473	30.3	495.4	21.8	41.5	307.9	997.6	661.6	1 666.0	53.0
	Establishments with 75 percent specialization or more	433	26.6	435.1	19.4	36.6	273.6	871.8	580.9	1 459.9	47.7
32934	Compression packings:										
	Establishments with this product class primary	10	1.4	23.4	1.1	2.2	18.9	63.4	28.6	88.7	.4
	Establishments with 75 percent specialization or more in class	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32935	Nonmetallic gaskets and gasketing:										
	Establishments with this product class primary	132	8.6	144.9	6.1	11.4	86.3	286.8	242.7	533.0	13.5
	Establishments with 75 percent specialization or more in class	94	3.9	62.2	2.8	5.4	36.3	129.1	122.9	253.6	5.9
32936	Molded packings and seals:										
	Establishments with this product class primary	72	7.3	114.8	5.4	10.5	74.2	240.3	120.1	362.6	9.9
	Establishments with 75 percent specialization or more in class	52	5.1	78.8	3.9	7.3	50.6	165.3	80.0	244.9	6.9
32937	Metallic gaskets and machined seals:										
	Establishments with this product class primary	33	3.0	56.0	2.2	4.2	36.8	116.9	82.0	198.7	6.7
	Establishments with 75 percent specialization or more in class	25	2.4	47.3	1.8	3.4	31.5	94.7	69.4	163.8	6.1
32938	Axial mechanical face seals:										
	Establishments with this product class primary	9	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
	Establishments with 75 percent specialization or more in class	6	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32939	Rotary oil seals:										
	Establishments with this product class primary	26	5.5	92.9	3.5	6.6	47.9	163.8	102.2	270.0	15.9
	Establishments with 75 percent specialization or more in class	18	4.0	67.4	2.5	4.8	35.1	121.3	75.3	201.1	13.8
3295	**Minerals, ground or treated:**										
	Entire industry	436	9.9	188.9	7.4	14.3	128.6	637.4	617.1	1 256.5	71.7
	Establishments with 75 percent specialization or more	412	9.3	177.8	7.0	13.4	121.9	611.5	593.1	1 204.2	69.5
3296	**Mineral wool:**										
	Entire industry	179	19.7	438.9	15.5	31.9	334.2	1 236.7	1 041.5	2 281.1	67.0
	Establishments with 75 percent specialization or more	167	18.9	420.3	14.9	30.6	319.2	1 207.6	1 006.0	(D)	64.8
32963	Mineral wool structural insulation made from produced fiber, made in same establishment:										
	Establishments with this product class primary	36	10.4	251.3	8.2	17.1	194.9	815.3	625.6	1 438.5	40.1
	Establishments with 75 percent specialization or more in class	31	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32964	Mineral wool industrial insulation made from produced fiber, made in same establishment:										
	Establishments with this product class primary	21	3.8	84.9	3.0	6.3	64.5	191.5	170.4	366.0	13.5
	Establishments with 75 percent specialization or more in class	16	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
32965	Mineral wool structural insulation made from purchased fiber, not made in same establishment:										
	Establishments with this product class primary	24	3.7	73.3	3.0	6.0	55.5	168.8	189.7	356.4	10.0
	Establishments with 75 percent specialization or more in class	21	3.6	71.3	2.9	5.9	54.3	163.5	181.3	342.6	9.7

See footnotes at end of table.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1982—Con.

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. Statistics for establishments with specialization ratios of less than 75 percent are included in total lines but are not shown as a separate class. In addition, data may not be shown for various reasons; e.g., to avoid disclosing data for individual companies. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes.]

Industry or product class code	Industry or product class by percent of specialization	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3296	**Mineral wool**—Con.										
32966	Mineral wool industrial insulation made from purchased fiber, not made in same establishment:										
	Establishments with this product class primary	20	1.2	22.1	.8	1.5	13.8	42.1	41.7	87.1	2.4
	Establishments with 75 percent specialization or more in class	16	1.0	18.7	.7	1.2	11.4	31.1	33.4	67.7	1.5
3297	**Nonclay refractories:**										
	Entire industry	119	6.8	148.4	4.6	8.7	93.0	333.1	343.3	691.0	48.5
	Establishments with 75 percent specialization or more	106	5.4	116.3	3.7	7.2	74.3	246.1	257.1	519.9	(D)
3299	**Nonmetallic mineral products, n.e.c.:**										
	Entire industry	583	6.5	94.5	4.8	10.0	63.9	240.3	177.7	422.3	38.3
	Establishments with 75 percent specialization or more	564	5.6	81.7	4.2	8.7	55.4	210.2	153.6	367.7	36.3

Note: For qualifications of data, see footnotes on table 1a.

Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments, Specialization and Coverage Ratios for the Industry: 1982 and Earlier Census Years

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments			
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio Col. B÷ Col. B+C (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio Col. B÷ Col. F (percent)
		A	B	C	D	E	F	G	H	I
3291	Abrasive products 1982	2 750.7	2 034.9	420.4	295.4	83	2 135.7	2 034.9	100.9	95
	1977	1 955.8	1 667.9	187.4	100.5	90	1 721.8	1 667.9	53.9	97
	1972	888.1	782.2	60.5	45.4	93	892.3	782.2	110.1	88
3292	Asbestos products 1982	842.8	762.0	65.2	15.6	92	841.0	762.0	79.0	91
	1977	882.1	781.4	66.7	34.0	92	960.1	781.4	178.7	81
	1972	763.4	653.9	61.6	47.9	91	742.6	653.9	88.7	88
3293	Gaskets, packing and sealing devices 1982	1 666.0	1 485.8	105.4	74.9	93	1 663.7	1 485.8	177.9	89
	1977	1 267.1	1 116.3	78.9	71.9	93	1 254.8	1 116.3	138.5	89
	1972	665.4	576.3	67.8	21.3	89	714.7	576.3	138.4	81
3295	Minerals, ground or treated 1982	1 256.5	1 166.1	25.4	65.1	98	1 252.9	1 166.1	86.8	93
	1977	957.3	818.6	33.1	105.5	96	911.0	818.6	92.4	90
	1972	414.4	349.8	18.9	45.7	95	391.5	349.8	41.7	89
3296	Mineral wool 1982	2 281.1	2 144.2	67.9	69.0	97	2 215.2	2 144.2	71.0	97
	1977	1 790.5	1 608.1	128.2	54.3	93	1 684.0	1 608.1	75.9	96
	1972	755.4	666.6	48.7	20.1	93	738.6	686.6	52.0	93
3297	Nonclay refractories 1982	691.0	588.7	94.9	7.4	86	715.8	588.7	127.1	82
	1977	680.2	607.1	52.5	20.6	92	734.0	607.1	126.9	83
	1972	342.1	312.7	21.8	7.6	94	372.1	312.7	59.4	84
3299	Nonmetallic mineral products, n.e.c. 1982	422.3	393.6	20.8	7.9	95	453.8	393.6	60.2	87
	1977	387.3	347.1	27.2	13.0	93	391.1	347.1	44.0	89
	1972	166.5	152.1	9.1	5.3	94	169.7	152.1	17.6	90

[1]Minimum percentage; exact percentage withheld to avoid disclosing data for individual companies.
[2]Relationships are not meaningful because of predominance of miscellaneous receipts, particularly receipts for contract and commission work on materials owned by others.

Table 5c-1. Industry-Product Analysis—Shipments by Product Class and Industry: 1982

[Million dollars. Table shows where products of an industry (referred to as primary and listed in table 6a) are made and what products are made by establishments classified in an industry. Read down an industry column to find what products are produced in an industry. Only those product groups that have at least $2 million in shipments from establishments classified in one of industries included in this chapter are shown. Read across to determine where products of industries in this chapter are produced. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column. Specified "Other industries" are listed in table 5c-2 if they account for more than $5 million of products primary to this chapter . For meaning of abbreviations and symbols, see explanatory text. For explanation of terms, see appendixes]

1982 product code	Product group, product class, and miscellaneous receipts	All industries	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Gaskets, packing and sealing devices (SIC 3293)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)	Other industries
	Total	(X)	2 750.7	842.8	1 666.0	1 256.5	2 281.1	691.0	422.3	(X)
	Primary products	(X)	2 034.9	762.0	1 485.8	1 166.1	2 144.2	588.7	393.6	(X)
	Secondary products	(X)	420.4	65.2	105.4	25.4	67.9	94.9	20.8	(X)
	Miscellaneous receipts	(X)	295.4	15.6	74.9	65.1	69.0	7.4	7.9	(X)
3291-	**Abrasive products**	2 135.7	2 034.9	-	(D)	-	-	(D)	-	(D)
32915	Nonmetallic sized grains, powders, and flour abrasive	409.7	385.4	-	-	-	-	(D)	-	(D)
32916	Nonmetallic abrasive products	610.8	579.4	-	(D)	-	-	(D)	-	(D)
32917	Nonmetallic coated abrasive products	843.1	(D)	-	-	-	-	-	-	(D)
32918	Metal abrasives, including scouring pads	173.9	170.0	-	-	-	-	-	-	3.8
32910	Abrasive products, n.s.k.	98.3	(D)	-	-	-	-	-	-	(D)
3292-	**Asbestos products**	841.0	-	762.0	(D)	-	(D)	(D)	-	61.5
32922	Asbestos friction materials	276.5	-	(D)	(D)	-	-	-	-	(D)
32928	Asphalt and vinyl asbestos floor tile	297.3	-	(D)	-	-	-	-	-	(D)
32929	Asbestos textiles, asbestos insulation, and asbestos-cement products	246.9	-	201.6	(D)	-	(D)	(D)	-	(D)
32920	Asbestos products, n.s.k.	20.3	-	(D)	-	-	(D)	-	-	-
3293-	**Gaskets, packing, and sealing devices**	1 663.7	(D)	6.3	1 485.8	-	(D)	-	-	(D)
32934	Compression packings	99.8	-	(D)	(D)	-	-	-	-	(D)
32935	Nonmetallic gaskets and gasketing	469.4	(D)	(D)	406.9	-	(D)	-	-	52.7
32936	Molded packings and seals	403.5	-	(D)	(D)	-	-	-	-	66.5
32937	Metallic gaskets and machined seals	225.5	-	-	219.7	-	-	-	-	5.8
32938	Axial mechanical face seals	89.8	-	-	89.8	-	-	-	-	-
32939	Rotary oil seals	275.8	-	-	252.2	-	-	-	-	23.6
32930	Gaskets, packing, and sealing devices, n.s.k.	100.0	-	-	93.8	-	-	-	-	6.3
32950	**Minerals and earths, ground or otherwise treated**	1 252.9	(D)	-	(D)	1 166.1	(D)	(D)	.9	(D)
3296-	**Mineral wool**	2 215.2	-	-	-	-	2 144.2	-	-	71.0
32963	Mineral wool structural insulation made from produced fiber, made in same establishment	1 193.0	-	-	-	-	(D)	-	-	(D)
32964	Mineral wool industrial insulation made from produced fiber, made in same establishment	545.7	-	-	-	-	(D)	-	-	(D)
32965	Mineral wool structural insulation made from purchased fiber, not made in same establishment	363.0	-	-	-	-	321.3	-	-	41.7
32966	Mineral wool industrial insulation made from purchased fiber, not made in same establishment	80.0	-	-	-	-	77.5	-	-	2.5
32960	Mineral wool, n.s.k.	33.4	-	-	-	-	31.4	-	-	2.0
32970	**Nonclay refractories, except dead-burned magnesia**	715.8	(D)	-	-	(D)	(D)	588.7	-	(D)
32990	**Nonmetallic mineral products, n.e.c.**	453.8	(D)	-	-	(D)	(D)	(D)	393.6	(D)
	OTHER SHIPMENTS BY FOUR-DIGIT PRODUCT GROUP									
1422-	Crushed and broken limestone	(X)	-	-	-	(D)	-	(D)	-	(X)
2297-	Nonwoven fabrics	(X)	(D)	(D)	-	-	(D)	-	-	(X)
2299-	Textile goods, n.e.c.	(X)	(D)	-	(D)	-	-	-	-	(X)
2499-	Wood products, n.e.c.	(X)	-	-	(D)	-	(D)	-	(D)	(X)
2641-	Coated and glazed paper	(X)	(D)	-	-	-	-	-	(D)	(X)
2645-	Die-cut paper and board	(X)	(D)	-	-	-	-	-	-	(X)
2819-	Industrial inorganic chemicals, n.e.c.	(X)	(D)	-	-	(D)	-	-	-	(X)
2842-	Polishes and sanitation goods	(X)	(D)	(D)	-	(D)	-	-	-	(X)
2891-	Adhesives and sealants	(X)	(D)	(D)	(D)	-	-	-	(D)	(X)
2899-	Chemical preparations, n.e.c.	(X)	(D)	-	-	(D)	-	-	(D)	(X)
2999-	Petroleum and coal products, n.e.c.	(X)	-	-	-	(D)	-	(D)	-	(X)
3069-	Fabricated rubber products, n.e.c.	(X)	-	-	26.7	-	-	-	-	(X)
3079-	Miscellaneous plastics products	(X)	(D)	(D)	7.3	-	(D)	-	(D)	(X)
3229-	Pressed and blown glass, n.e.c.	(X)	-	-	-	-	(D)	-	(D)	(X)
3255-	Clay refractories	(X)	-	-	-	(D)	(D)	21.2	-	(X)
3273-	Ready-mixed concrete	(X)	-	-	-	(D)	-	-	-	(X)
3274-	Lime	(X)	-	-	-	-	-	(D)	-	(X)
3275-	Gypsum products	(X)	-	-	-	(D)	(D)	-	(D)	(X)
3429-	Hardware, n.e.c.	(X)	(D)	-	(D)	-	-	-	-	(X)
3443-	Fabricated plate work (boiler shops)	(X)	-	-	(D)	-	-	-	-	(X)
3499-	Fabricated metal products, n.e.c.	(X)	-	(D)	8.0	-	(D)	-	-	(X)
3531-	Construction machinery	(X)	(D)	-	(D)	-	-	-	-	(X)
3541-	Machine tools, metal cutting types	(X)	(D)	-	-	-	-	-	-	(X)
3545-	Machine tool accessories	(X)	4.8	-	-	-	-	-	-	(X)
3559-	Special industry machinery, n.e.c.	(X)	(D)	-	-	-	-	-	-	(X)
3585-	Refrigeration and heating equipment	(X)	-	-	(D)	-	-	-	-	(X)
3589-	Service industry machinery, n.e.c.	(X)	(D)	-	-	-	-	-	-	(X)
3599-	Machinery, except electrical, n.e.c.	(X)	(D)	(D)	13.6	-	-	-	-	(X)
3661-	Telephone and telegraph apparatus	(X)	(D)	-	-	-	-	-	-	(X)
3714-	Motor vehicle parts and accessories	(X)	-	11.2	(D)	-	-	-	-	(X)
3728-	Aircraft equipment, n.e.c.	(X)	(D)	(D)	-	-	-	-	-	(X)
3842-	Surgical appliances and supplies	(X)	(D)	-	-	-	-	-	-	(X)
3861-	Photographic equipment and supplies	(X)	(D)	-	-	-	-	-	-	(X)

See footnotes at end of table.

Table 5c-1. Industry-Product Analysis—Shipments by Product Class and Industry: 1982—Con.

[Million dollars. Table shows where products of an industry (referred to as primary and listed in table 6a) are made and what products are made by establishments classified in an industry. Read down an industry column to find what products are produced in an industry. Only those product groups that have at least $2 million in shipments from establishments classified in one of industries included in this chapter are shown. Read across to determine where products of industries in this chapter are produced. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column. Specified "Other industries" are listed in table 5c-2 if they account for more than $5 million of products primary to this chapter . For meaning of abbreviations and symbols, see explanatory text. For explanation of terms, see appendixes]

1982 product code	Product group, product class, and miscellaneous receipts	All industries	Abrasive products (SIC 3291)	Asbestos products (SIC 3292)	Gaskets, packing and sealing devices (SIC 3293)	Minerals, ground or treated (SIC 3295)	Mineral wool (SIC 3296)	Nonclay refractories (SIC 3297)	Nonmetallic mineral products, n.e.c. (SIC 3299)	Other industries
	MISCELLANEOUS RECEIPTS									
93000 00	Receipts for work done for others on their materials	(X)	3.9	-	4.7	(D)	5.4	.7	.9	(X)
99980 13	Sales of scrap and refuse	(X)	(D)	(D)	(D)	5.7	(D)	(D)	(D)	(X)
99980 41	Receipts for research and development work	(X)	-	-	-	(D)	-	-	(D)	(X)
99980 61	Receipts for repair work	(X)	(D)	-	(D)	-	-	-	-	(X)
99980 00	Miscellaneous receipts, including receipts for repair work, etc.	(X)	(D)	(D)	8.2	5.3	(D)	(D)	.5	(X)
99980 98	Other miscellaneous receipts, including receipts for repair work, etc., n.s.k.	(X)	-	(D)	(D)	3.8	(D)	(Z)	.4	(X)
99989 00	Sales of products bought and resold without further manufacture, processing, or assembly at establishment	(X)	285.7	15.4	59.9	13.5	62.5	6.3	6.4	(X)

Table 5c-2. Industry-Product Analysis—Other Industries With Shipments of Primary Products: 1982

[Million dollars. Table is a continuation of table 5c-1 and shows where products of industries in this chapter (referred to as primary products and listed in table 6a) are made. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column of table 5c-1. Specified "Other industries" are listed in this table if they account for more than $5 million of products primary to this chapter. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

1982 product code	Other industries	Value	1982 product code	Other industries	Value
3291-	**ABRASIVE PRODUCTS**		**3295-**	**MINERALS, GROUND OR TREATED**	
	2899 Chemical preparations, n.e.c.	(D)		3273 Ready-mixed concrete	8.5
	3541 Machine tools, metal cutting types	(D)		3275 Gypsum products	16.5
	3991 Brooms and brushes	(D)	**3296-**	**MINERAL WOOL**	
3292-	**ASBESTOS PRODUCTS**			2661 Building paper and board mills	(D)
	2952 Asphalt felts and coatings	(D)		3229 Pressed and blown glass, n.e.c.	(D)
	3714 Motor vehicle parts and accessories	(D)	**3297-**	**NONCLAY REFRACTORIES**	
3293-	**GASKETS, PACKING, AND SEALING DEVICES**			3255 Clay refractories	48.1
				3264 Porcelain electrical supplies	(D)
	3069 Fabricated rubber products, n.e.c.	73.7		3274 Lime	10.2
	3079 Miscellaneous plastics products	16.7		3624 Carbon and graphite products	(D)
	3494 Valves and pipe fittings	6.6	**3299-**	**NONMETALLIC MINERAL PRODUCTS, N.E.C.**	
	3592 Carburetors, pistons, rings, valves	(D)		2851 Paints and allied products	(D)
	3644 Noncurrent-carrying wiring devices	(D)		3079 Miscellaneous plastics products	(D)
	3714 Motor vehicle parts and accessories	(D)		3275 Gypsum products	(D)

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	ABRASIVE PRODUCTS						
3291- —	**Total**	(NA)	(X)	2 135.7	(NA)	(X)	1 721.8
32915 —	Nonmetallic sized grains, powders, and flour abrasives (including graded products only)	(NA)	(X)	409.7	(NA)	(X)	[3]356.2
	Artificial (synthetic):						
32915 17	Silicon carbide, 1,000 s tons	13	**103.6	85.6	15	*282.2	114.8
32915 19	Aluminum oxide, do.	15	*166.9	104.0	13	**201.7	99.3
32915 29	Other artificial sized grains, powders and flour, including combinations of silicon carbide and aluminum oxide, boron carbide, tungsten carbide, synthetic diamond, etc.	22	(X)	208.9	16	(X)	135.6
32915 48	Nonmetallic natural sized grains, powders, and flour	6	(X)	11.1	3	(X)	6.1
32915 00	Nonmetallic sized grains, powders, and flour abrasives, n.s.k.	(NA)	(X)	-	(NA)	(X)	.4
32916 —	Nonmetallic abrasive products (including diamond abrasives)	(NA)	(X)	610.8	(NA)	(X)	[3]441.7
	Artificial and natural bonded abrasives (including grinding wheels, sticks, stones, hones, balls, and bricks) (excluding refractory bricks, floor and stair brick, and similiar byproducts):						
32916 31	Vitrified bond	28	(X)	181.3	26	(X)	146.3
32916 37	Resinoid and shellac bond, reinforced	36	(X)	95.4	31	(X)	75.0
32916 42	Resinoid and shellac bond, nonreinforced	31	(X)	130.1	29	(X)	99.0
32916 44	Rubber bond	11	(X)	19.5	11	(X)	22.3
32916 65	Other bonded abrasives	8	(X)	5.0	4	(X)	4.2
	Diamond wheels:						
32916 72	Metal bond, 1,000 carats	25	(S)	57.8	15	(S)	31.1
32916 74	Other bond, do.	31	(S)	54.6	16	6 215.3	31.4
32916 76	Cubic boron nitride wheels, all bonds, do.	10	*764.0	7.7	7	(S)	2.7
32916 98	Other artificial and natural nonmetallic abrasive products (except coated abrasives) (including grinding, lapping, buffing compounds, crude lump forms, etc.)	25	(X)	59.1	18	(X)	26.1
32916 00	Nonmetallic abrasive products, n.s.k.	(NA)	(X)	.3	(NA)	(X)	3.6
32917 —	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps	(NA)	(X)	843.1	(NA)	(X)	627.8
	Coated or impregnated with any natural or artifical abrasive material:						
	Cloth-glue bond:						
32917 12	Belts, 1,000 reams	7	(S)	16.5	10	(S)	16.7
32917 14	Other shapes, do.	13	(S)	62.9	13	(S)	47.8
	Cloth-resin and waterproof bond:						
32917 16	Belts, do.	11	(S)	182.2	14	(S)	170.2
32917 18	Other shapes, do.	15	(S)	81.9	16	(S)	69.4
	Paper-glue bond:						
32917 22	Belts, do.	7	(S)	184.5	7	(S)	100.4
32917 24	Other shapes, do.	9			7		
	Paper-resin and waterproof bond:						
32917 26	Belts, do.	8	(D)	(4)	9	(S)	123.9
32917 28	Other shapes, do.	6	(D)	(4)	9		
32917 39	Other (including paper-cloth combination, vulcanized fiber-cloth combination, vulcanized fibers, etc.)	10	(D)	[4]271.0	11	(X)	69.9
32917 71	Buffing and polishing wheels and laps made of cloth, leather, felt, and other materials	15	(X)	43.0	18	(X)	28.6
32917 00	Nonmetallic coated abrasive products and buffing wheels, polishing wheels, and laps, n.s.k.	(NA)	(X)	1.2	(NA)	(X)	.8
32918 —	Metal abrasives (including scouring pads)	(NA)	(X)	173.9	(NA)	(X)	176.8
32918 11	Steel and iron grit, shot, and sand, 1,000 s tons	8	*138.3	55.2	13	287.1	82.3
32918 31	Steel wool, do.	3	(S)	17.6	5	8.4	15.5
32918 90	Other metal abrasives and scouring pads (including metal pads with soaps)	14	(X)	100.5	12	(S)	77.8
32918 00	Metal abrasives, n.s.k.	(NA)	(X)	.5	(NA)	(X)	1.2
32910 00	Abrasive products, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	25.2	(NA)	(X)	60.2
32910 02	Abrasive products, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	73.1	(NA)	(X)	59.0
	ASBESTOS PRODUCTS						
3292- —	**Total**	(NA)	(X)	841.0	(NA)	(X)	960.1
32922 —	Asbestos friction materials	(NA)	(X)	276.5	(NA)	(X)	271.7
	Brake linings:						
32922 11	Woven, containing asbestos yarn, tape, or cloth, 1,000 linear ft	7	*23 728.4	53.2	9	(S)	28.1
32922 15	Molded, including all nonwoven types, 1,000 cu ft	14	(S)	88.7	18	(S)	154.1
32922 21	Disc brake pads, mil pieces	9	(S)	61.4	8	89.5	89.1
	Clutch facing:						
32922 51	Woven, containing asbestos yarn, tape, or cloth, do.	3	(5)	(5)	2		
32922 55	Molded, including all nonwoven types, do.	4	[5]23.3	[5]72.6	6		
32922 00	Asbestos friction materials, n.s.k.	(NA)	(X)	.5	(NA)	(X)	.3

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	ASBESTOS PRODUCTS—Con.						
32928 —	Asphalt and vinyl asbestos floor tile	(NA)	(X)	297.3	(NA)	(X)	232.1
32928 13	Asphalt floor tile, mil sq yd	1			3	(6)	(6)
	Vinyl asbestos floor tile:						
32928 15	Plain backed, do	5	86.7	297.3	6	94.5	166.2
32928 17	Adhesive backed, do	4			6	[6]27.4	[6]65.9
32928 00	Asphalt and vinyl asbestos floor tile, n.s.k.	(NA)	(X)	–	(NA)	–	–
32929 —	Asbestos textiles, asbestos insulation, and other asbestos and asbestos-cement products	(NA)	(X)	246.9	(NA)	(X)	429.1
	Asbestos textiles:						
32929 11	Yarn, cord, and thread, mil lb	3	(S)	22.5	3	(S)	15.7
32929 21	Cloth, do	4			6	(S)	17.4
32929 31	Other asbestos textiles, including roving, lap, wick, rope, tape, carded fibers, etc., do	6	(S)	16.6	7	(S)	17.2
	Asbestos felts:						
32929 33	Roofing, asphalt or tar saturated, 1,000 s tons	5	*34.5	23.1	9	(S)	69.6
32929 34	Other, do	5	**13.9	10.5	5	(S)	27.7
32929 36	Insulation materials containing asbestos (including pipe and block insulation)	5	(X)	4.1	(NA)	(S)	11.1
	Asbestos-cement products:						
32929 41	Flat sheets and wallboard, all thicknesses converted to 1/4 in. basis, 1,000 sq ft	5	*247.9	22.6	9	[1]809.0	25.3
32929 51	Corrugated sheets, do	1			3		
32929 73	Pipe, conduits, and ducts, excluding pressure pipe, 1,000 s tons	2	(NA)	117.6	5	(NA)	215.4
32929 75	Pressure pipe, do	3			4		
32929 77	Shingles and clapboard, including accessories, mil squares	3	(S)	22.0	3	1.4	18.7
32929 98	Other asbestos and asbestos-cement products, including millboard and prefabricated housing components	5	(X)	5.5	8	(X)	10.9
32929 00	Asbestos textiles, asbestos insulation, and other asbestos and asbestos-cement products, n.s.k.	(NA)	(X)	2.5	(NA)	(X)	.1
32920 00	Asbestos products, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	7.1	(NA)	(X)	13.0
32920 02	Asbestos products, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	13.2	(NA)	(X)	14.0
	GASKETS, PACKING, AND SEALING DEVICES						
3293- —	**Total**	**(NA)**	**(X)**	**1 663.7**	**(NA)**	**(X)**	**1 254.8**
32934 —	Compression packings	(NA)	(X)	99.8	(NA)	(X)	42.0
32934 11	Plant fiber	4	(X)	3.3			
32934 13	Asbestos containing	12	(X)	7.9			
32934 15	Synthetic fiber, plastics composition	12	(X)	17.9	16	(X)	42.0
32934 17	All other compression packings, n.e.c.	10	(X)	70.7			
32934 00	Compression packings, n.s.k.	(NA)	(X)	–	(NA)	(X)	(NA)
32935 —	Nonmetallic gaskets and gasketing	(NA)	(X)	469.4	(NA)	(X)	380.4
32935 11	Asbestos, compressed	47	(X)	45.8	45	(X)	58.4
32935 13	Asbestos, beater saturated	29	(X)	28.3	22	(X)	16.0
32935 15	Elastomeric, all material	99	(X)	169.0	101	(X)	159.1
32935 17	Paper, felt base, and plant fiber	28	(X)	50.1	32	(X)	51.3
32935 19	Cork and cork composition	39	(X)	44.0	41	(X)	30.1
32935 21	Flurocarbon, including envelope type	8	(X)	3.9	(7)	(X)	(7)
32935 23	Asbestos cloth, including cloth with binder	14	(X)	6.0	13	(X)	7.5
32935 29	Other nonmetallic, n.e.c.	67	(X)	113.8	[7]48	(X)	[7]47.0
32935 00	Nonmetallic gaskets and gasketing, n.s.k.	(NA)	(X)	8.4	(NA)	(X)	11.0
32936 —	Molded packings and seals	(NA)	(X)	403.5	(NA)	(X)	375.8
32936 21	O-rings, including spliced, excluding metal	41	(X)	103.1	31	(X)	89.9
32936 22	Squeeze type, solid section ring seals including rectangular, quad, delta, D, tee; excluding O-rings	20	(X)	27.9	10	(X)	24.6
32936 25	Flexible seals, dual component-cushioned rings, backed, constrained, or loaded by an elastomeric ring	15	(X)	35.7			
32936 26	Flexible seals, single and multiple component—lip type, both symmetrical and nonsymmetrical (V-ring, V-ring sets, U-cup, cup seal, flange seal, collar seal, single lip, nonsymmetrical)	32	(X)	71.3	23	(X)	43.7
32936 30	Diaphragm seal—flat, rolling	24	(X)	32.5	20	(X)	24.5
32936 35	All other molded packings and seals, including leather and plastics seals, exclusion devices (nonmetallic), and piston rings (nonmetallic)	65	(X)	133.0	(NA)	(X)	181.3
32936 00	Molded packings and seals, n.s.k.	(NA)	(X)	–	(NA)	(X)	11.8
32937 —	Metallic gaskets and machined seals	(NA)	(X)	225.5	(NA)	(X)	120.7
32937 29	Spiral wound filler type	14	(X)	36.0			
32937 39	Heavy cross-section, API type	11	(X)	26.0			
32937 41	Piston rings (nonautomotive)	2	(X)	(8)	38	(X)	120.7
32937 43	Exclusion devices	1	(X)	(8)			
32937 49	Other metal gaskets and machined seals, n.e.c.	43	(X)	[8]163.4			
32937 00	Metallic gaskets and machined seals, n.s.k.	(NA)	(X)	–			
32938 —	Axial mechanical face seals	(NA)	(X)	89.8	(NA)	(X)	100.0
32938 10	Complete mechanical seals with single coil springs	7	(X)	(9)			
32938 13	Complete mechanical seals with multiple coil springs	5	(X)	(9)			
32938 15	Complete mechanical seals with bellows	3	(X)	[9]71.5	8	(X)	100.0
32938 17	Parts for all axial mechanical face seals	6	(X)	3.6			
32938 19	Clearance, labrynith, and other face seals, n.e.c.	4	(X)	14.6			
32938 00	Axial mechanical face seals, n.s.k.	(NA)	(X)	–			

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1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	GASKETS, PACKING, AND SEALING DEVICES—Con.						
32939 —	Rotary oil seals	(NA)	(X)	275.8	(NA)	(X)	177.3
32939 70	Bonded, sprung (spring loaded) (Elastomeric material bonded chemically to a reinforcing insert during vulcanization. Configuration being designed to retain an annular compression or extension spring.)	14	(X)	143.4			
32939 73	Bonded, unsprung (nonspring loaded) (Elastomeric material bonded chemically to a reinforcing member during vulcanization. These designs do not require a spring.)	17	(X)	38.7			
32939 75	Unitized (A multiplicity of components, some of which may be chemically bonded, pressed, or crimped together to be sold and installed as a unit; seals could also include wear rings or sealing counterfaces.)	9	(X)	23.8	12	(X)	177.3
32939 77	Nonmetallic (can be bonded or assembled seals using nonmetallic reinforcing members or all rubber which may rely on the application housing for proper support)	10	(X)	14.3			
32939 79	Nonbonded assembled (Unitized seal with components mechanically crimped or pressed together usually sold and used as a unit.)	6	(X)	12.8			
32939 81	Other (Labyrinth, proximity, all metallic, inflatable, displacement, or boundary lubrication seals.)	8	(X)	42.7			
32939 00	Rotary oil seals, n.s.k.	(NA)	(X)	–			
32930 00	Gaskets, packing, and sealing devices, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	48.2	(NA)	(X)	24.6
32930 02	Gaskets, packing, and sealing devices, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	51.8	(NA)	(X)	34.1
	MINERALS, GROUND OR TREATED						
3295– —	**Total**	**(NA)**	**(X)**	**1 252.9**	**(NA)**	**(X)**	911.0
32950 —	Minerals and earths, ground or otherwise treated:						
32950 11	Lightweight aggregate (such as diatomaceous earth, expanded clay, expanded slag, cinders, perlite, haydite, pumice, but excluding vermiculite) 1,000 s tons	59	**2 397.9	198.5	36	(S)	79.8
	Exfoliated vermiculite:						
32950 13	Aggregate mil cu ft	15	*62.0	78.6	5	*21.5	12.3
32950 15	Other (such as loose fill insulation, acoustical, etc.) do	6	*18.2	16.8	7	**44.4	26.4
32950 20	Refractory magnesia, including dead-burned magnesia or magnesite:						
	As reported in the census of manufactures	10	(X)	129.5	8	(X)	66.7
	As reported in the Current Industrial Report MQ-32C, Shipments of Refractories	(NA)	(X)	179.5	(NA)	(X)	67.1
	Dead-burned magnesia or magnesite:						
32950 23	Domestic shipments for direct use as finished refractory products and all exported material 1,000 s tons	(NA)	(D)	(10)	(NA)	(NA)	14.1
32950 25	All other domestic shipments predominantly for use as a refractory raw material do	(NA)	232.0	66.9	(NA)	(NA)	53.0
32950 0A	Refractory magnesia, including dead-burned magnesia or magnesite, n.s.k.	(NA)	(X)	10 62.6	(NA)	(X)	–
32950 31	Crushed slag 1,000 s tons	21	**16 142.0	64.6	23	26 499.0	66.3
32950 61	Crushed and ground uncalcined gypsum, including gypsite and anhydrite do	12	*1 181.4	20.0	5	*2 128.4	36.7
32950 81	Natural graphite, ground, refined, or blended do	8	230.8	128.9	8	(D)	(D)
32950 84	Ground crude fire clay, high alumina clay, and silica fire clay do	14	(S)	28.1	10	340.4	51.0
32950 85	Clays artificially activated with acid or other materials do	9	(S)	36.5	5	(D)	(D)
32950 86	Mica, ground or treated do	6	**38.5	8.0	3	47.8	5.2
32950 94	Talc, steatite, soapstone, and pyrophyllite, ground or otherwise treated do	4	(S)	26.6	4	(D)	(D)
32950 98	Other minerals and earths, ground or otherwise treated, including feldspar, roofing granules, and ground borite do	71	(X)	453.8	62	(X)	273.8
32950 00	Minerals, ground or treated, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	41.8	(NA)	(X)	92.8
32950 02	Minerals, ground or treated, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	21.2	(NA)	(X)	12.8

See footnotes at end of table.

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1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	MINERAL WOOL						
3296– —	**Total**	**(NA)**	**(X)**	**2 215.2**	79	**(X)**	**1 684.0**
32963 —	Mineral wool for thermal and acoustical envelope insulation (for insulating homes, and commercial and industrial buildings) made from fiber produced in the same establishment	(NA)	(X)	1 193.0	(NA)	(X)	907.9
32963 11	Loose fiber (blowing and pouring) (shipped as such) and granulated fiber—1,000 s tons	13	360.7	131.2	(NA)	411.4	110.2
	Building batts, blankets, and rolls (in thermal resistance (R) values):						
32963 31	R-19.0 or more—do	7	584.2	428.9	(NA)	396.7	273.2
32963 35	R-11.0 to R-18.9—do	8	*461.2	355.6	(NA)	445.2	322.7
32963 38	R-10.9 or less—do	5	*57.5	44.2	(NA)	(S)	46.6
32963 51	Board (such as roof insulation)—do	2	(D)	(11)	(NA)	(D)	(11)
32963 61	Acoustical, such as wall and ceiling (sold as acoustical insulation)—do	8	*51.0	34.7	(NA)	(S)	52.2
32963 98	Other mineral wool for thermal insulation[13]—do	9	(S)	11198.1	(NA)	(S)	11103.0
32963 00	Mineral wool for thermal and acoustical envelope insulation (for insulating homes, and commercial and industrial buildings) made from fiber produced in the same establishment, n.s.k.	(NA)	(X)	.3	(NA)	(X)	(NA)
32964 —	Mineral wool for industrial, equipment, and appliance insulation made from fiber produced in the same establishment	(NA)	(X)	545.7	(NA)	(X)	457.0
	Blankets (flexible) including fabricated pieces, rolls, and batts:						
32964 31	Plain—1,000 s tons	7	190.9	154.9	(NA)	169.6	143.5
32964 34	Coated—do	5	23.6	57.8	(NA)	17.6	31.2
32964 36	Faced and metal meshed—do	6			(NA)	26.5	38.7
32964 45	Special purpose insulation pieces, such as special purpose automotive, appliance, and aerospace items and original equipment parts—do	4	12.7	33.5	(NA)	12.5	21.8
32964 51	Other blocks and boards—do	3	11.0	8.2	(NA)	25.1	18.6
32964 61	Pipe insulation—do	6	29.5	114.1	(NA)	24.2	76.2
32964 83	Acoustical, including pads, boards, patches, etc.—do	3			(NA)	26.4	31.3
32964 98	Other mineral wool for insulation, including air duct, loose fiber (shipped as such), granulated fiber, insulating, and finishing cements, high temperature insulation fibers, etc.[13]—do	8	(X)	177.2	(NA)	(X)	95.7
32964 00	Mineral wool for industrial, equipment, and appliance insulation made from fiber produced in the same establishment, n.s.k.	(NA)	(X)	–	(NA)	(X)	(NA)
32965 —	Mineral wool for thermal and acoustical envelope insulation (for insulating homes and commercial and industrial buildings) made from fiber purchased or transferred from other establishments	(NA)	(X)	363.0	(NA)	(X)	191.0
32965 11	Loose fiber (blowing and pouring) (shipped as such) and granulated fiber—1,000 s tons	1	(D)	(12)	(NA)	–	–
	Building batts, blankets and rolls (in thermal resistance (R) values):						
32965 31	R-19.0 or more—do	4	(S)	3.3	(NA)	(D)	(D)
32965 35	R-11.0 to R-18.9—do	6	(S)	5.0	(NA)	12.2	13.5
32965 38	R-10.9 or less—do	5	(S)	7.5	(NA)	(D)	(D)
32965 51	Board (such as roof insulation)—do	5	(D)	(12)	(NA)	(D)	(D)
32965 61	Acoustical, such as wall and ceiling (sold as acoustical insulation)—do	8	(S)	296.5	(NA)	(S)	155.1
32965 98	Other mineral wool for thermal insulation[13]—do	6	(S)	1249.9	(NA)	(X)	6.0
32965 00	Mineral wool for thermal and acoustical envelope insulation (for insulating homes, and commercial and industrial buildings) made from fiber purchased or transferred from other establishments, n.s.k.	(NA)	(X)	.8	(NA)	(X)	(NA)
32966 —	Mineral wool for industrial, equipment, and appliance insulation made from fiber purchased or transferred from other establishments	(NA)	(X)	80.0	(NA)	(X)	111.9
	Blankets (flexible) including fabricated pieces, rolls, and batts:						
32966 31	Plain—1,000 s tons	3	(S)	1.8	(NA)	15.3	21.3
32966 34	Coated—do	3	(S)	9.4	(NA)	.6	1.2
32966 36	Faced and metal meshed—do	3			(NA)	(S)	7.0
32966 45	Special purpose insulation pieces, such as special purpose automotive, appliance, and aerospace items and original equipment parts—do	5	(S)	13.2	(NA)	9.2	18.6
22966 51	Other blocks and boards—do	3	(S)	2.6	(NA)	26.5	16.0
32966 61	Pipe insulation—do	5	(S)	20.9	(NA)	9.4	14.6
32966 83	Acoustical, including pads, boards, patches, etc.—do	4					
32966 98	Other mineral wool for insulation, including air duct, loose fiber (shipped as such), granulated fiber, insulating and finishing cements, high temperature insulation fibers, etc.[13]—do	11	(S)	31.6	(NA)	(NA)	33.2
32966 00	Mineral wool for industrial, equipment, and appliance insulation made from fiber purchased or transferred from other establishments, n.s.k.	(NA)	(X)	.4	(NA)	(X)	(NA)

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1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	MINERAL WOOL—Con.						
32960 00	Mineral wool, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	11.2	(NA)	(X)	2.4
32960 02	Mineral wool, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	22.2	(NA)	(X)	13.6
	NONCLAY REFRACTORIES						
3297- —	**Total**	**(NA)**	**(X)**	**715.8**	**(NA)**	**(X)**	734.0
32970 —	Nonclay refractories, except dead-burned magnesia:						
32970 00	Nonclay refractories, except dead-burned magnesia:						
	As reported in the census of manufactures	(NA)	(X)	700.5	82	(X)	726.0
	As reported in the Current Industrial Report MQ-32C, Shipments of Refractories	(NA)	(X)	709.5	(NA)	(X)	718.9
	Nonclay refractories:						
	Brick and shapes:						
32970 12	Silica brick and shapes — mil 9 in.	(NA)	(D)	(D)	(NA)	32.7	31.0
	Magnesite and magnesite-chrome brick and shapes, and chrome brick:						
32970 13	Magnesite-carbon brick and shapes, less than 7 percent carbon, predominantly pitch or resin bonded; does not include carbon impregnated magnesite brick — do.	(NA)	15.7	32.3	(NA)	21.8	46.6
32970 14	Magnesite-carbon brick and shapes, 7 percent carbon or more, predominantly pitch and resin bonded; does not include carbon impregnated magnesite brick — do.	(NA)	6.8	28.1			
32970 17	Carbon impregnated magnesite brick and shapes — do.	(NA)	5.3	24.4	(NA)	6.3	19.1
32970 15	Magnesite brick and shapes, burned and unburned, does not include carbon impregnated magnesite brick — do.	(NA)	(D)	(D)	(NA)	[14]	[14]
32970 19	Magnesite-chrome brick and shapes, high fired (3050 degrees F or more) — do.	(NA)	19.9	79.5	(NA)	11.4	30.3
32970 20	Magnesite-chrome brick and shapes, except high fired, including burned and unburned brick as well as chrome brick — do.	(NA)	8.5	28.0			
32970 25	Basic pouring pit refractories including sleeves, nozzles, runners, tuyeres, and ladle gate parts, excluding molten cast — do.	(NA)	(D)	(D)	(NA)	[14]62.3	[14]147.5
32970 33	Graphite crucibles, retorts, stopper heads, and other shaped refractories containing natural graphite — 1,000 s tons	(NA)	16.3	30.7	(NA)	20.3	26.8
32970 35	Carbon refractories, brick, blocks, and shapes, excluding those containing natural graphite — mil 9 in.	(NA)	(D)	(D)	(NA)	[15]	[15]
32970 48	Silicon carbide kiln furniture (made predominantly of silicon carbide) — do.	(NA)	.8	9.5	(NA)	1.8	11.3
32970 49	Silicon carbide bricks and shapes (made predominantly of silicon carbide) except kiln furniture — do.	(NA)	2.5	31.5	(NA)	2.3	19.0
32970 52	Mullite brick and shapes (made predominantly of synthetic or fused mullites, excluding molten cast) — do.	(NA)	2.2	12.4	(NA)	3.6	13.7
32970 54	Extra high alumina brick and shapes (made predominantly of fused and synthetic aluminas, excluding molten cast) — do.	(NA)	4.3	41.1	(NA)	12.1	28.7
32970 56	Extra high alumina pouring pit refractories including sleeves, nozzles, runners, tuyeres, and ladle gate parts — do.	(NA)	(D)	(D)			
32970 55	Zircon and zirconia brick and shapes (made predominantly of either of these materials) — do.	(NA)	1.9	20.8	(NA)	3.3	16.0
32970 57	Dolomite and dolomite-magnesite brick and shapes and other brick containing a substantial amount of dolomite grains (including burned, unburned, and carbon impregnated products) — do.	(NA)	(D)	(D)	(NA)	[15]30.4	[15]109.0
32970 59	Molten cast shapes, including all chemical compositions produced by this method of manufacture — do.	(NA)	(D)	(D)			
32970 60	All other brick and shapes including forsterite, forsterite-magnesite, pyrophilite, pyrophilite-zircon, and all other brick an shapes not listed elsewhere, excluding molten cast) — do.	(NA)	4.8	44.3			
	Unshaped nonclay refractories:						
	Mortars:						
32970 61	Basic bonding mortars (made predominantly of magnesite or chrome ore) — 1,000 s tons	(NA)	3.9	1.9	(NA)	8.7	2.5
32970 62	Extra high alumina mortars (made predominantly of fused or synthetic alumina and mullite) — do.	(NA)	10.0	6.3	(NA)	15.4	6.5
32970 63	Other nonclay mortars (forsterite, zircon, and silica) — do.	(NA)	2.8	1.1	(NA)	7.8	2.6

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1982 product code	Product	1982			1977		
		Number of companies with shipments of $100,000 or more	Product shipments[1]		Number of companies with shipments of $100,000 or more	Product shipments[1]	
			Quantity[2]	Value (million dollars)		Quantity[2]	Value (million dollars)
	NONCLAY REFRACTORIES—Con.						
32970 --	Nonclay refractories, except dead-burned magnesia —Con.						
32970 00	Nonclay refractories, except dead-burned magnesia —Con. As reported in the Current Industrial Report MQ-32C, Shipments of Refractories —Con. Nonclay refractories —Con. Unshaped nonclay refractories —Con. Plastics refractories and ramming mixes, wet and dry types, and castables of nonhydraulic setting type:						
32970 65	Basic castables, plastics, and ramming mixes (wet and dry types) ---- 1,000 s tons--	(NA)	56.4	25.1	(NA)	98.3	25.8
32970 64	Extra high alumina plastics and ramming mixes (made predominantly of fused or synthetic aluminas and mullite; does not include phosphate bonded products) ---- do--	(NA)	9.9	10.8	(NA)	75.5	31.2
32970 66	Extra high alumina phosphate bonded plastics and ramming mixes (made predominantly of fused or synthetic aluminas and mullite) ---- do--	(NA)	10.4	13.0			
32970 69	Other nonclay plastics refractories and ramming mixes (forsterite, zircon, etc.) ---- do--	(NA)	19.6	15.6			
32970 68	Extra high alumina castables (hydraulic setting) (made predominantly of fused or synthetic alumina and mullite) ---- do--	(NA)	8.9	9.8	(NA)	38.1	18.0
32970 93	Other nonclay refractory castables (hydraulic setting) ---- do--	(NA)	5.0	4.7			
	Gunning mixes:						
32970 71	Basic nonclay gunning mixes (including chrome, chrome-magnesia, magnesia-chrome, magnesia, and dolomite) ---- do--	(NA)	213.3	78.0	(NA)	359.4	74.1
32970 73	Other nonclay gunning mixes (forsterite, zircon, etc.) ---- do--	(NA)	2.6	1.0			
	Other nonclay refractory materials in lump or ground form including ground silica, not included above:						
32970 94	Domestic shipments for direct use by customers as a finished refractory and all exported material ---- do--	(NA)	139.2	21.1	(NA)	213.8	24.7
32970 96	All other domestic shipments of nonclay refractory materials sold in lump or ground form as refractory raw materials (does not include magnesite) ---- do--	(NA)	88.7	14.0	(NA)	157.4	34.5
32970 0A	Nonclay refractories, except dead-burned magnesia, n.s.k. ----	-	(X)	18.5	(NA)	(X)	-
32970 02	Nonclay refractories, n.s.k., typically for establishments with less than 20 employees (see note) ----	(NA)	(X)	15.2	(NA)	(X)	8.0
	NONMETALLIC MINERAL PRODUCTS, N.E.C.						
3299- --	**Total** ----	**(NA)**	**(X)**	**453.8**	**(NA)**	**(X)**	**391.1**
32990 --	Other nonmetallic mineral products, n.e.c.:						
	Mica products:						
32990 53	Built-up sheet mica products ----	7	(X)	13.7	7	(X)	16.9
32990 55	Other sheet mica products ----	7	(X)	4.5	9	(X)	11.1
32990 56	Mica products, other than sheet ----	8	(X)	16.6	7	(X)	15.8
32990 81	Statuary and art goods (factory production) ----	52	(X)	40.6	29	(X)	19.6
32990 94	Other nonmetallic mineral products, including magnesite floor composition, stucco, artificial graphite, synthetic stones, sand-lime brick, block and tile, calcium silicate, and perlite pipe covering, etc. ----	62	(X)	304.7	37	(X)	245.0
32990 00	Other nonmetallic mineral products, n.e.c., n.s.k., typically for establishments with 20 employees or more (see note) ----	(NA)	(X)	41.8	(NA)	(X)	50.4
32990 02	Other nonmetallic mineral products, n.e.c., n.s.k., typically for establishments with less than 20 employees (see note) ----	(NA)	(X)	31.9	(NA)	(X)	32.4

Note: In 1982 Census of Manufactures, data for establishments of small single-unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoff used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1982 and 1977 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

[1]Data reported by all producers, not just those with shipments of $100,000 or more.

[2]For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

[3]Nonmetallic natural sized grains, powders, and flour were included in product class 32916 in published 1977 data. These products have been reclassified in product class 32915 for 1982.

[4]For 1982, product codes 32917 26 and 32917 28 are combined with product code 32917 39 to avoid disclosing data for individual companies.

[5]For 1982, data for product codes 32922 51 and 32922 55 are combined to avoid disclosing data for individual companies.

[6]For 1977, data for product code 32928 13 were combined with product code 32928 17 to avoid disclosing data for individual companies.

[7]For 1977, product code 32935 21 was included with product code 32935 29 to avoid disclosing data for individual companies.

[8]For 1982, product codes 32937 41 and 32937 43 were combined with product code 32937 49 to avoid disclosing data for individual companies.

[9]For 1982, product codes 32938 10 and 32938 13 were combined with product code 32938 15 to avoid disclosing data for individual companies.

[10]For 1982, product code 32950 23 is included with 32950 0A to avoid disclosing data for individual companies.

[11]For 1982 and 1977, product codes 32963 51 and 32963 98 are combined to avoid disclosing data for individual companies.

[12]For 1982, product codes 32965 11 and 32965 51 are combined with product code 32965 98 to avoid disclosing data for individual companies.

[13]Includes noninsulation mineral wool products, n.e.c.

[14]For 1977, product code 32970 15 was included with product code 32970 25.

[15]For 1977, product code 32970 35 was included with product codes 32970 57, 32970 59, and 32970 60.

Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1982 and 1977

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than $2 million in product class shipments or they disclose data for individual companies in 1982. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Product class and geographic area	1982 value of product shipments	1977 value of product shipments
32915, NONMETALLIC SIZED GRAINS, POWDERS, AND FLOUR ABRASIVE		
United States	**409.7**	**(NA)**
Connecticut	12.0	(NA)
Massachusetts	63.7	(NA)
New York	96.2	(NA)
Pennsylvania	23.4	(NA)
32916, NONMETALLIC ABRASIVE PRODUCTS		
United States	**610.8**	**(NA)**
California	47.4	(NA)
Illinois	50.6	(NA)
Massachusetts	221.0	(NA)
Michigan	36.0	(NA)
New Jersey	21.3	(NA)
New York	62.3	(NA)
Ohio	66.2	(NA)
Pennsylvania	25.8	(NA)
Texas	7.5	(NA)
32917, NONMETALLIC COATED ABRASIVE PRODUCTS		
United States	**843.1**	**627.8**
California	4.5	13.2
Illinois	2.6	6.5
Massachusetts	14.3	11.4
Michigan	20.5	(NA)
New York	139.7	94.2
North Carolina	18.2	(NA)
Ohio	27.5	22.0
32918, METAL ABRASIVES, INCLUDING SCOURING PADS		
United States	**173.9**	**176.8**
Ohio	55.1	46.7
32922, ASBESTOS FRICTION MATERIALS		
United States	**276.5**	**271.7**
New Jersey	13.0	(EE)
32929, ASBESTOS TEXTILES, ASBESTOS INSULATION, AND ASBESTOS-CEMENT PRODUCTS		
United States	**246.9**	**429.1**
Pennsylvania	23.3	33.5
32934, COMPRESSION PACKINGS		
United States	**99.8**	**(NA)**
Michigan	3.0	(NA)
Pennsylvania	4.7	(NA)
32935, NONMETALLIC GASKETS AND GASKETING		
United States	**469.4**	**380.4**
California	33.0	38.2
Connecticut	10.3	12.0
Illinois	72.4	93.9
Indiana	8.4	12.8
Maryland	4.4	(NA)
Massachusetts	36.7	20.8
Michigan	18.8	58.0
Minnesota	9.8	(NA)
Missouri	18.5	3.9
New Jersey	20.2	22.2
New York	26.2	20.0
Ohio	29.9	38.0
Pennsylvania	29.1	18.5
Texas	25.7	30.6
Virginia	18.2	(NA)
Wisconsin	31.4	26.1
32936, MOLDED PACKINGS AND SEALS		
United States	**403.5**	**(NA)**
California	67.2	(NA)
Connecticut	11.7	(NA)
Illinois	34.5	(NA)
Indiana	41.2	(NA)
Massachusetts	34.6	(NA)
Michigan	10.8	(NA)
Minnesota	12.6	(NA)
New Jersey	25.8	(NA)
New York	10.9	(NA)
Ohio	23.8	(NA)
Pennsylvania	15.8	(NA)
Texas	32.2	(NA)
West Virginia	3.1	(NA)
Wisconsin	4.3	(NA)
32937, METALLIC GASKETS AND MACHINED SEALS		
United States	**225.5**	**(NA)**
California	26.3	(NA)
Illinois	70.2	(NA)
New Jersey	17.1	(NA)
Ohio	4.1	(NA)
Oklahoma	3.1	(NA)
Texas	36.7	(NA)
32939, ROTARY OIL SEALS		
United States	**275.8**	**(NA)**
California	26.0	(NA)
Illinois	45.0	(NA)
New Jersey	2.3	(NA)
Texas	15.2	(NA)
32963, MINERAL WOOL STRUCTURAL INSULATION MADE FROM PRODUCED FIBER, MADE IN SAME ESTABLISHMENT		
United States	**1 193.0**	**907.9**
California	188.5	91.5
Georgia	175.7	(GG)
Indiana	35.8	47.5
Kansas	219.2	159.3
New Jersey	149.0	(GG)
Pennsylvania	14.2	49.7
Texas	137.7	(GG)
32964, MINERAL WOOL INDUSTRIAL INSULATION MADE FROM PRODUCED FIBER, MADE IN SAME ESTABLISHMENT		
United States	**545.7**	**457.0**
Indiana	87.9	66.7
32965, MINERAL WOOL STRUCTURAL INSULATION MADE FROM PURCHASED FIBER, NOT MADE IN SAME ESTABLISHMENT		
United States	**363.0**	**191.0**
California	9.1	8.1
Indiana	7.6	(NA)
Ohio	12.5	5.7
32966, MINERAL WOOL INDUSTRIAL INSULATION MADE FROM PURCHASED FIBER, NOT MADE IN SAME ESTABLISHMENT		
United States	**80.0**	**111.9**
Ohio	11.8	9.9
Pennsylvania	2.3	(CC)

Note: For 1977, the following value ranges (in million dollars) substitute for actual figures withheld to avoid disclosing data for individual companies: AA—less than $2.0 but not 0; BB—$2.0 to $4.9; CC—$5.0 to $9.9; EE—$10.0 to $19.9; FF—$20.0 to $49.9; GG—$50.0 or more.

Table 6c. Product Classes—Value Shipped by All Producers: 1982 and Earlier Years

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

1982 product code	Product class	1982	1981[1]	1980[1]	1979[1]	1978[1]	1977	1972	1967
3291-	**Abrasive products**	**2 135.7**	**2 539.6**	**2 319.7**	**2 339.9**	**2 056.0**	**1 721.8**	**892.3**	**734.2**
32915	Nonmetallic sized grains, powders, and flour abrasive	409.7	1 160.8	1 084.7	1 111.0	918.1	797.9	449.6	410.3
32916	Nonmetallic abrasive products	610.8							
32917	Nonmetallic coated abrasive products	843.1	1 083.2	968.9	875.2	779.9	627.8	293.9	225.4
32918	Metal abrasives, including scouring pads	173.9	201.2	194.0	234.4	186.8	176.8	107.4	75.0
32910	Abrasive products, n.s.k.	98.3	94.4	72.1	119.3	(S)	119.2	41.4	23.5
3292-	**Asbestos products**	**841.0**	**1 023.2**	**1 029.9**	**1 097.2**	**1 028.8**	**960.1**	**742.6**	**(NA)**
32922	Asbestos friction materials	276.5	394.2	353.5	373.0	308.2	271.7	209.5	144.4
32928	Asphalt and vinyl asbestos floor tile	297.3	312.4	339.0	288.1	248.9	232.1	(NA)	(NA)
32929	Asbestos textiles, asbestos insulation, and asbestos-cement products	246.9	276.0	322.0	417.3	448.4	429.1	(NA)	(NA)
32920	Asbestos products, n.s.k.	20.3	40.6	15.4	18.8	(S)	27.0	5.3	3.6
3293-	**Gaskets, packing, and sealing devices**	**1 663.7**	**1 835.9**	**1 654.7**	**1 629.7**	**1 444.9**	**1 254.8**	**714.7**	**(NA)**
32934	Compression packings	99.8					42.0		
32935	Nonmetallic gaskets and gasketing	469.4					380.4		
32936	Molded packings and seals	403.5					375.8		
32937	Metallic gaskets and machined seals	225.5	1 721.4	1 508.3	1 541.0	1 386.3	120.7	(NA)	(NA)
32938	Axial mechanical face seals	89.8					100.0		
32939	Rotary oil seals	275.8					177.3		
32930	Gaskets, packing, and sealing devices, n.s.k.	100.0	114.5	146.4	88.7	(S)	58.7	46.7	(NA)
32950	**Minerals and earths, ground or otherwise treated**	**1 252.9**	**1 343.2**	**1 249.5**	**1 210.0**	**1 178.2**	**911.0**	**391.5**	**270.7**
3296-	**Mineral wool**	**2 215.2**	**2 238.4**	**2 128.0**	**2 055.2**	**1 927.7**	**1 684.0**	**738.7**	**425.0**
32963	Mineral wool structural insulation made from produced fiber, made in same establishment	1 193.0	1 131.1	1 105.7	1 064.8	1 049.0	907.9	(NA)	(NA)
32964	Mineral wool industrial insulation made from produced fiber, made in same establishment	545.7	621.3	563.9	537.5	452.1	457.0	(NA)	(NA)
32965	Mineral wool structural insulation made from purchased fiber, not made in same establishment	363.0	330.2	317.7	299.9	249.8	191.0	(NA)	(NA)
32966	Mineral wool industrial insulation made from purchased fiber, not made in same establishment	80.0	89.2	100.6	112.3	(S)	111.9	(NA)	(NA)
32960	Mineral wool, n.s.k.	33.4	66.7	40.2	40.9	(S)	16.0	8.2	12.9
32970	**Nonclay refractories, except dead-burned magnesia**	**715.8**	**1 082.7**	**1 084.9**	**982.1**	**934.1**	**734.0**	**372.1**	**302.6**
32990	**Nonmetallic mineral products, n.e.c.**	**453.8**	**518.1**	**565.0**	**523.5**	**406.6**	**391.1**	**169.7**	**87.5**

[1]Figures are estimates derived from a representative sample of manufacturing establishments canvassed in annual survey of manufactures and, therefore, may differ from results that would be obtained from a complete canvass of all manufacturing establishments. Standard errors associated with estimates are published in annual survey of manufactures volumes for this period.

Table 7. Materials Consumed by Kind: 1982 and 1977

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
	INDUSTRY 3291, ABRASIVE PRODUCTS				
	Materials, parts, containers, and supplies	**(X)**	**1 033.9**	**(X)**	**799.1**
149941	Natural abrasive materials	(X)	37.1	(X)	50.8
281950	Aluminum oxide, 1,000 s tons	(S)	108.1	**208.5	102.7
281992	Silicon carbide, do	(S)	83.1	(S)	42.3
281962	Alumina zirconia, do	(S)	17.0	*21.5	18.6
280009	Other industrial chemicals	(X)	26.4	(X)	22.5
289101	Glues and adhesives, mil lb	(S)	72.7	(S)	41.1
220101	Cotton and manmade fiber fabrics, broad woven and narrow woven	(X)	87.0	(X)	81.4
260001	Paper and paperboard products	(X)	80.7	(X)	47.8
190039	Diamond, carats	(S)	14.8	(X)	(3)
281998	Cubic boron nitride, do	*685.9	1.5	(X)	(3)
970099	All other materials and components, parts, containers, and supplies	(X)	402.8	(X)	3213.9
971000	Materials, parts, containers, and supplies, n.s.k.[2]	(X)	102.7	(X)	177.9
	INDUSTRY 3292, ASBESTOS PRODUCTS				
	Materials, parts, containers, and supplies	**(X)**	**381.3**	**(X)**	**391.4**
149971	Asbestos, crude, including fiber, 1,000 s tons	*246.1	64.9	311.2	107.7
324101	Portland cement, do	**152.4	10.1	399.1	17.8
207010	Vegetable oils, including crude and processed, mil lb	*4.1	1.3	10.0	3.3
249941	Cork products	(X)	(D)	(X)	(Z)
266111	Building paper and board	(X)	-	(X)	.1
280023	Pigment, organic and inorganic, mil lb	11.5	7.2	18.4	9.5
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc, but excluding sheets, rods, tubes, and shapes, mil lb	194.3	61.2	216.0	66.1
282202	Synthetic rubber, do	29.4	2.1	(D)	(D)
	Natural rubber:				
084913	Latex (dry solids content), 1,000 s tons	-	-	1.7	1.4
084915	Dry, do	(D)	(D)	(Z)	(Z)
289102	Adhesives and sealants	(X)	(D)	(X)	1.9
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets	(X)	-	(X)	(D)
331018	Tin plate, terne plate, and black plate, 1,000 s tons	-	-	(D)	(D)
335002	Nonferrous metal mill shapes and forms, do	(D)	(D)	(D)	(D)
349012	Fabricated wire products, including springs and spring wire, do	-	-	(D)	(D)
970099	All other materials and components, parts, containers, and supplies	(X)	182.5	(X)	142.1
971000	Materials, parts, containers, and supplies, n.s.k.[2]	(X)	47.4	(X)	28.1

See footnotes at end of table.

Table 7. Materials Consumed by Kind: 1982 and 1977—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity[1]	Delivered cost (million dollars)	Quantity[1]	Delivered cost (million dollars)
	INDUSTRY 3293, GASKETS, PACKING, AND SEALING DEVICES				
	Materials, parts, containers, and supplies	**(X)**	**569.1**	**(X)**	**450.2**
149971	Asbestos, crude, including fiber, 1,000 s tons	(S)	12.7	(S)	22.0
324101	Portland cement, do	(D)	[5]	(X)	[4]
207010	Vegetable oils, including crude and processed, mil lb	(D)	[5]	(X)	[4]
249941	Cork products	(X)	12.2	(X)	8.9
266111	Building paper and board	(X)	14.6	(X)	(D)
280023	Pigment, organic and inorganic, mil lb	17.8	2.5	(X)	[4]
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes, do	(S)	18.9	(S)	15.0
282202	Synthetic rubber, do	(S)	69.7	(S)	50.5
	Natural rubber:				
084913	Latex (dry solids content), 1,000 s tons	(S)	.5	(S)	1.1
084915	Dry, do	(S)	1.8	(S)	10.3
289102	Adhesives and sealants	(X)	4.1	(X)	2.8
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets	(X)	6.9	(X)	12.8
331018	Tin plate, terne plate, and black plate, 1,000 s tons	(S)	26.5	(S)	12.3
335002	Nonferrous metal mill shapes and forms, do	(S)	23.8	(D)	(D)
349012	Fabricated wire products, including springs and spring wire, do	(S)	7.0	(S)	10.4
970099	All other materials and components, parts, containers, and supplies	(X)	[5]237.3	(X)	[4]244.1
971000	Materials, parts, containers, and supplies, n.s.k.[2]	(X)	130.6	(X)	[4]
	INDUSTRY 3295, MINERALS, GROUND OR TREATED				
	(Materials consumed data were not collected)				
	INDUSTRY 3296, MINERAL WOOL				
	Materials, parts, containers and supplies	**(X)**	**733.5**	**(X)**	**546.3**
145501	Clay	(X)	3.4	(X)	6.2
147001	Barite, borate, potash, fluorspar, and rocksalt	(X)	33.1	(X)	36.1
220101	Cotton and manmade fiber fabrics, broad woven and narrow woven	(X)	5.5	(X)	14.5
264338	Paper shipping sacks, 1,000 s tons	(S)	10.4	*40.7	13.6
265001	Paperboard containers and boxes, including folding corrugated, fiber and set-up, do	(S)	15.8	(S)	13.2
260001	All other paper and paperboard products	(X)	49.9	(S)	47.4
281000	Industrial inorganic chemicals	(X)	66.2	(X)	49.6
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes, mil lb	217.8	45.6	*215.7	37.5
322931	Glass fiber (textile type, bonded mat type, etc.), 1,000 lb	(S)	47.9	(X)	[6]
307903	Plastics products consumed in the form of sheets, rods and tubes, and other shapes	(X)	15.2	(X)	12.7
289101	Glues and adhesives	(S)	22.0	(X)	13.0
329103	Abrasives and miscellaneous nonmetallic minerals products	(X)	13.6	(X)	13.7
329201	Asbestos products	(X)	[7]	(D)	(D)
331212	Crude blast furnace slag, 1,000 s tons	2 123.3	18.4	1 057.5	9.9
335301	Aluminum sheet, plate, and foil, do	4.0	7.9	*7.6	11.0
349702	Converted aluminum foil, mil lb	(S)	20.4	(D)	(D)
970099	All other materials and components, parts, containers, and supplies	(X)	[7]307.0	(X)	[6]233.9
971000	Materials, parts, containers, and supplies, n.s.k.[2]	(X)	51.1	(X)	27.6
	INDUSTRY 3297, NONCLAY REFRACTORIES				
	Materials, parts, containers, and supplies	**(X)**	**277.8**	**(X)**	**284.0**
145001	Clay, ceramic, and refractory minerals, 1,000 s tons	291.7	52.2	*309.8	50.4
327404	Dead-burned dolomite, do	(NA)	[9]	(NA)	[8]
329502	Dead-burned magnesia or magnesite, do	200.1	65.4	*429.7	71.5
320591	Refractories, clay or nonclay, do	(S)	47.8	(S)	35.7
280001	Industrial chemicals	(X)	6.6	(X)	[8]
970099	All other materials and components, parts, containers, and supplies	(X)	[9]74.2	(X)	[8]84.4
971000	Materials, parts, containers, and supplies, n.s.k.[2]	(X)	31.6	(X)	42.0
	INDUSTRY 3299, NONMETALLIC MINERAL PRODUCTS, N.E.C.				
	(Materials consumed data were not collected)				

[1]For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

[2]Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

[3]For 1977, material codes 190039 and 281998 were included with material code 970099.

[4]For 1977, material codes 207010, 324101, 280023, and 971000 were included with material code 970099.

[5]For 1982, material codes 324101 and 207010 are included with material code 970099.

[6]For 1977, material code 322931 was combined with material code 970099.

[7]For 1982, material code 329201 is combined with material code 970099 to avoid disclosing data for individual companies.

[8]For 1977, material codas 327404 and 280001 were included with material code 970099.

[9]For 1982, material code 327404 is included with material code 970099.

APPENDIX A.
Explanation of Terms

This appendix is in two sections. Section 1 includes items which were requested of all establishments that were mailed census of manufactures forms including annual survey of manufactures (ASM) forms. Note that this section also includes several items (number of establishments and companies, value added, classes of products, and specialization and coverage ratios) that were not included on the report forms but were derived from information collected on the forms. Section 2 covers supplementary items that were requested only from establishments included in the ASM sample. Results of the supplementary ASM inquiries are included in tables 3c and 3d of this report.

SECTION 1. ITEMS COLLECTED OR DERIVED BASED ON ALL CENSUS OF MANUFACTURES (INCLUDING ASM) REPORT FORMS

Number of establishments and companies—As discussed in the Introduction, a separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

If the company operates at different physical locations, even if the individual locations are producing the same line of goods, a separate report was requested for each location. If the company operates in two or more distinct lines of manufacturing at the same location, a separate report was requested for each activity.

An establishment not in operation for any portion of the year was requested to return the report form with the proper notation in the "Operational Status" section of the form. In addition, the establishment was requested to report data on the number of custodial employees, capital expenditures, inventories, or any shipments from inventories during the portion of the year the plant was in operation.

In this report, data are shown for establishments in operation at any time during the year. A comparison with the number of establishments in operation at the end of the year will be provided in the Introduction to Part 1 of the General Summary subject report.

Employment and related items—The regular report forms requested separate information on production workers as of a payroll period for each quarter of the year and on other employees as of the payroll period which included the 12th of March.

All employees—This item includes all full-time and part-time employees on the payrolls of operating manufacturing establishments during any part of the pay period ending nearest the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average for the payroll periods including the 12th of March, May, August, and November.

Production workers—This item includes workers (up through the line-supervisor level) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Employees above the working-supervisor level are excluded from this item.

All other employees—This item covers nonproduction employees of the manufacturing establishment including those engaged in factory supervision above the line-supervisor level. It includes sales (including driver salespersons), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office function, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical employees. Also included are employees on the payroll of the manufacturing establishment who are engaged in the construction of major additions or alterations to the plant and who are utilized as a separate work force.

In addition to reports sent to operating manufacturing establishments, information on employment during the payroll period which included March 12 and annual payrolls was also requested of auxiliary units (e.g., administrative offices, warehouses, and research and development laboratories) of multiestablishment companies. However, these figures are not included in the totals for individual industries shown in this report. They are included in the general summary and geographic area reports and in the final bound volumes as a separate category.

Payrolls—This item includes the gross earnings of all employees on the payroll of operating manufacturing establishments paid in the calendar year 1982. Respondents were told they could follow the definition of payrolls used for calculating the Federal withholding tax. It includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers

of corporations, but excludes payments to proprietors or partners of unincorporated concerns. Also excluded are payments to members of Armed Forces and pensioners carried on the active payroll of manufacturing establishments.

The census definition of payrolls is identical to that recommended to all Federal statistical agencies by the Office of Management and Budget. It should be noted that this definition does not include employers' Social Security contributions or other nonpayroll labor costs, such as employees' pension plans, group insurance premiums, and workers' compensation.

The ASM provides estimates of employers' supplemental labor costs, both those required by Federal and State laws and those incurred voluntarily or as part of collective bargaining agreements. (Supplemental labor costs are explained later in this appendix.)

As in the case of employment figures, the payrolls of separate auxiliary units of multiestablishment companies are not included in the totals for individual industries or industry groups.

Production-worker hours—This item covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave.

Cost of materials—This term refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuel consumed, whether purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (1) all raw materials, semifinished goods, parts, components, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year, (2) electric energy purchased, (3) fuels consumed for heat, power, or the generation of electricity, (4) work done by others on materials or parts furnished by manufacturing establishments (contract work), and (5) products bought and resold in the same condition. (See discussion of duplication of data below.)

Specific materials consumed—In addition to the total cost of materials, which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. The inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Information on the specific materials consumed is shown in table 7 if appropriate to the industry. Establishments consuming less than a specified amount (usually $10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which either administrative records or short forms were used was imputed as "not specified by kind." (See the Introduction for the importance of administrative records in the industry.)

Value of shipments—This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit. (See discussion of duplication of data below.)

Individual products—As in previous censuses, data were collected for almost all industries on the quantity and value of individual products shipped. In the 1982 census program, information was collected on the output of approximately 11,000 individual product items. The term "product," as used in the census of manufactures, represents the finest level of detail for which output information was requested. Consequently, it is not necessarily synonymous with the term "product" as used in the marketing sense. In some cases it may be much more detailed and, in other cases, it is more aggregative. For example, "pharmaceutical preparations" was distributed into over 100 items; whereas, "motor gasoline" was reported as a single item.

Approximately 6,000 of the product items were listed separately on the 1982 census report forms. Data for about 5,000 products were obtained in the monthly, quarterly, or annual surveys comprising the Current Industrial Reports series of the Census Bureau. Totals for the year 1982 for these items, as derived from the commodity surveys, are shown in the "products shipped" table (table 6a) together with the tieline total value collected in the census for reconciliation purposes.

The list of products for which separate information was collected was prepared after consultation with industry and government representatives. Comparability with previous figures was given considerable weight in the selection of product categories so that comparable 1977 information is presented for most products.

Typically, both quantity and value of shipments information was collected. However, if quantity was not significant or could not be reported by manufacturers, only value of shipments was collected.

Shipments include both commercial shipments and transfers of products to other plants of the same company. For industries in which a considerable portion of the total shipments is transferred to other plants of the same company, separate information on interplant transfers was also collected. Moreover, for products that are used to a large degree within the same establishment as materials or components in the fabrication of other products, total production and often consumption of the item within the plant was collected. Typically, the information on production was also collected for products for which there are significant differences between total production and shipments in a given year because of wide fluctuations in finished goods inventories. Other measures of output of products with long production cycles were used as appropriate and feasible.

Classes of products—To summarize the product information, the separate products were aggregated into classes of products that, in turn, were grouped into all primary products of each industry. The code structure used is a seven-digit number for the

individual product, a five-digit number for the class of product, and a four-digit number for the total primary products in an industry. (See Introduction, Industry Classification of Establishments, for application of the coding structure to the assignment of SIC codes for establishments.)

In the 1982 census, the 11,000 products were grouped into approximately 1,500 separate classes on the basis of general similarity of manufacturing processes, types of materials used, and the like. However, the grouping of products was affected by the economic significance of the class and, in some cases, dissimilar products were grouped because the products were not sufficiently significant to warrant separate classes.

Duplication in cost of materials and value of shipments—The aggregate of the cost of materials and value of shipments figures for industry groups and for all manufacturing industries includes large amounts of duplication, since the products of some industries are used as materials by others. With some important exceptions, such as for motor vehicles and parts, this duplication is not significant at the four-digit industry level. However, it is significant at the two-digit and three-digit industry group level because these totals often include industries that represent successive stages in the production of a finished manufactured product. Examples are the addition of flour mills to bakeries in the "Food" group and the addition of pulp mills to paper mills in the "Paper and Allied Products" group of industries. Estimates of the overall extent of this duplication indicate that the value of manufactured products exclusive of such duplication (the value of finished manufactures) tends to approximate two-thirds of the total value of products reported in the census of manufactures.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning- and end-of-year inventories.

Because of the change in instructions for reporting inventories for 1982, the 1982 figure for value added is not strictly comparable to prior-year data. This is explained more fully in the inventories section below.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

New and used capital expenditures—For establishments in operation and establishments under construction but not yet in operation, manufacturers were asked to report their new expenditures for (1) permanent additions and major alterations to manufacturing establishments, and (2) machinery and equipment used for replacement and additions to plant capacity if they were of the type for which depreciation accounts were ordinarily maintained.

The totals for new expenditures exclude that portion of expenditures leased from nonmanufacturing concerns, new facilities owned by the Federal Government but operated under contract by private companies, and plant and equipment furnished to the manufacturer by communities and nonprofit organizations. Also excluded are expenditures for used plant and equipment (although reported in the census), expenditures for land, and cost of maintenance and repairs charged as current operating expenses.

Manufacturers were also requested to report the value of all used buildings and equipment purchased during the year at the purchase price. For any equipment or structure transferred to the use of the reporting establishment by the parent company or one of its subsidiaries, the value at which it was transferred to the establishment was to be reported. Furthermore, if the establishment changed ownership during the year, the cost of the fixed assets (building and equipment) was to be reported under used capital expenditures.

Total expenditures for used plant and equipment is a universe figure; i.e., it is collected on all census forms. However, the breakdown of this figure between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form and is subject to sampling error (see table 3d). The data for total new capital expenditures, new building expenditures, and new machinery expenditures, as well as the data for total used expenditures, are shown in both tables 3a and 3d. The figure in table 3a is a census universe total and may differ from the results of the ASM sample shown in table 3d. Since the figures in table 3d are subject to sampling error, they are not considered as reliable as the universe figures.

End-of-year inventories—Respondents were asked to report their 1981 and 1982 end-of-year inventories at cost or market. Effective with the 1982 Economic Censuses, this change to a uniform instruction for reporting inventories was introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

Because of this change in reporting instructions, the 1982 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown in table 1a of this report and in historical census of manufactures and annual survey of manufactures publications. Inventories and value added data estimated on a basis comparable to the historical data, using the reported information for 1982, are shown in footnote 4 of table 1a. However, the end-of-1981 figure shown in this footnote may differ from the corresponding value published as part of the 1981 Annual Survey of Manufactures.

This difference at the four-digit SIC level is due primarily to the effects of industry shifts. As described in the Industry Classification of Establishments section of the Introduction, ASM noncertainty plants are allowed to shift from one industry to another in a census year; whereas, they are "frozen" in a particular industry in ASM years. Other explanations for this difference include the effects of sampling and processing errors and revisions to end-of-1981 data reported by respondents.

In using inventory data by stage of fabrication for "all industries" and at the two-digit industry level, it should be noted that an item treated as a finished product by an establishment in one industry may be reported as a raw material by another establishment in a different industry. For example, the finished-product inventories of a steel mill would be reported as raw

materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for individual industries, industry groups, and "all manufacturing," which are aggregates of figures reported by establishments in specified industries.

Specialization and coverage ratios—These items are not collected on the report forms but are derived from the data shown in table 5b. An establishment is classified in a particular industry if its shipments of primary products of that industry exceed in value its shipments of the products of any other single industry.

As noted in the Introduction, an establishment's shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). Specialization and coverage ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in tables 1a through 5a and data on product shipments shown in tables 6a through 6c.

Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments wherever classified.

SECTION 2. ITEMS COLLECTED ONLY ON ASM REPORT FORMS

Supplemental labor costs—Supplemental labor costs are divided into legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of Federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not specifically required by legislation whether they were employer initiated or the result of collective bargaining. They include the employer portion of such plans as insurance premiums, premiums for supplemental accident and sickness insurance, pension plans, supplemental unemployment compensation, welfare plans, stock purchase plans on which the employer payment is not subject to withholding tax, and deferred profit-sharing plans. They exclude such items as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing for employees. While the excluded items do benefit employees and all or part of their cost generally is similar to the items covered in the ASM labor costs statistics, accounting records do not generally provide reliable figures on net employee benefits of these types.

Cost of purchased services—ASM establishments were requested to provide information on the cost of purchased services for the repair of buildings and other structures, the repair of machinery, and communication services. Included in the cost of purchased services for the repair of buildings and machinery are payments made for all maintenance and repair work on buildings and equipment, such as painting, roof repairs, replacing parts, and overhauling equipment. Such payments made to other establishments of the same company and for repair and maintenance of any leased property are also included. Extensive repairs or reconstruction that were capitalized are considered capital expenditures for used buildings and machinery and are, therefore, excluded from this item. Repair and maintenance costs provided by an owner as part of a rental contract or incurred directly by an establishment in using its own work force are also excluded.

The response coverage ratio shown in table 3d for each of the three types of purchased services listed above is a measure of the extent to which respondents reported for each item. It is derived for each item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight; see section 3) for those ASM establishments that reported the specific inquiry to the weighted total employment for all ASM establishments classified in the industry.

Electric energy used for heat and power—Data on the cost of purchased electric energy were collected on all census forms. However, data on the quantity of purchased electric energy and quantity of generated-less-sold electric energy were collected only on the ASM forms. The cost and quantity of purchased electric energy represent the amount actually used during the year for heat and power. In addition, information was collected on the quantity of electric energy generated by the establishment and the quantity of electric energy sold or transferred to other plants of the same company.

Beginning- and end-of-year depreciable assets—The data encompass all fixed depreciable assets on the books of establishments at the beginning and at the end of the year. The values shown (book value) represent the actual cost of assets at the time they were acquired, including all costs incurred in making the assets usable (such as transportation and installation). Included are all buildings, structures, machinery, and equipment (production, office, and transportation equipment) for which depreciation reserves are maintained. Excluded are nondepreciable capital assets, including inventories and intangible assets, such as patent rights and royalties. Also excluded are land and depletable assets, such as timber and mineral rights.

The definition of fixed depreciable assets is consistent with the definition of capital expenditures. For example, expenditures include actual capital outlays during the year, rather than the final value of equipment put in place and buildings completed during the year. Accordingly, the value of assets at the end of the year includes the value of construction in progress. In addition, respondents were requested to make certain that assets at the beginning of the year plus new and used capital expenditures, less retirements, equalled assets at the end of the year.

New and used capital expenditures—The data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used capital expenditures are collected on all census forms. However, the breakdown between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. (See further explanation on capital expenditures in section 1.)

Breakdown of new capital expenditures for machinery and equipment—ASM establishments were requested to separate their capital expenditures for new machinery and equipment into (1) automobiles, trucks, etc., for highway use, (2) computers and peripheral data processing equipment, and (3) all other.

The category "automobiles, trucks, etc., for highway use" is intended to measure expenditures for vehicles designed for highway use that were acquired through a purchase or lease-purchase agreement. Vehicles normally operating off public highways (vehicles specifically designed to transport materials, property, or equipment on mining, construction, logging, and petroleum development projects) are excluded from this item.

The "not specified by kind" or n.s.k. item for expenditures for new machinery and buildings, shown in table 3d, represents the total machinery and equipment expenditures for establishments that did not break down their expenditures for the three specific categories. This means that for most industries the specific categories are understated.

Retirements—Included in this item is the gross value of assets sold, retired, scrapped, destroyed, etc., during 1982. When a complete operation or establishment changed ownership, the respondent was instructed to report the value of the assets sold at the original cost as recorded in the books of the seller. The respondent was also requested to report retirements of equipment or structures owned by a parent company that the establishment was using as if it were a tenant.

Rental payments—This item includes rental payments for the use of all items for which depreciation reserves would be maintained if they were owned by the establishment, e.g., structures and buildings, and production, office, and transportation equipment. Excluded are royalties and other payments for the use of intangibles and depletable assets, and land rents where separable.

When an establishment of a multiestablishment company was charged rent by another part of the same company for the use of assets owned by the company, it was instructed to exclude that cost from rental payments. However, the book value (original cost) of these company-owned assets was to be reported as assets of the establishment at the end of the year.

If there were assets at an establishment rented from another company, and the rents were paid centrally by the head office of the establishment, the company was instructed to report these rental payments as if they were paid directly by the establishment.

Depreciation charges—This item includes depreciation and amortization charged during the year against assets. Depreciation charged against fixed assets acquired since the beginning of the year and against assets sold or retired during the year are components of this category. Respondents were requested to make certain that they did not report accumulated depreciation.

APPENDIX B.
Annual Survey of Manufactures (ASM) Sampling and Estimating Methodologies

DESCRIPTION OF SURVEY SAMPLE

The Annual Survey of Manufactures (ASM) contains two components. The mail portion of the survey is a probability sample of about 55,000 manufacturing establishments selected from a total of about 225,000 establishments. These 225,000 establishments represent all manufacturing establishments of multiunit companies and all single-unit manufacturing establishments with five employees or more tabulated in the 1977 Census of Manufactures. This mail portion is supplemented by a Social Security Administration list of new manufacturing establishments opened after 1977. The individual establishments were defined as the sampling unit for this sample. This is a change from the previous ASM sample when companies were used as the sampling unit. The implication of this change is that the probability of selection of any establishment relates only to the size of the establishment itself and is independent of the size of the company with which the establishment is affiliated. The efficiencies associated with the change to an establishment sample have made it possible to reduce the mail sample panel from 70,000 establishments in 1978 to 55,000 establishments in the current panel.

The nonmail portion of the survey includes all single-unit establishments that were tabulated with less than five employees in the 1977 Census of Manufactures. Although this portion contained approximately 125,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of other Federal agencies. This administrative record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under special conditions, which safeguard the confidentiality of both tax and census records. Estimates for data for these small establishments were developed using industry averages in conjunction with the administrative information.

The corresponding estimates for the mail and nonmail establishments were added together, along with the adjusted base-year differences as defined in Description of Estimating Procedures below. The remaining description of the survey sample relates only to the mail portion of the ASM sample.

All establishments with 250 employees or more in the 1977 census were included in the survey panel with certainty. These establishments collectively account for approximately 65 percent of the total value of shipments for manufacturing establishments in the 1977 census. Smaller establishments were sampled with probabilities ranging from 1.000 down to 0.005 in accordance with mathematical theory for optimum allocation of a sample.

The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. For establishments included in the 1977 Census of Manufactures, the measure of size depended directly upon each establishment's 1977 product class values and the historic variability of the year-to-year shipments of each product class. Roughly equivalent measures of size were assigned to postcensus birth establishments based on their industry codes and anticipated payroll and employment.

The method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight to differences in employment, value added, and other general statistics, for these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of establishments into and out of a given sample panel without introducing a bias into the survey estimates.

DESCRIPTION OF ESTIMATING PROCEDURES

Most of the ASM estimates for the years 1978-1981 were computed using a modified "difference estimate" formula. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1977 census published number for an item total and the linear ASM estimate of the total for 1977. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

This base-year difference was then adjusted to reflect the estimated growth at the four-digit or, in the case of product classes, five-digit based Standard Industrial Classification (SIC) level from 1977 to the year of the survey; for example, 1981. It should be noted that due to processing constraints, the growth factors lagged one year; i.e., if 1981 is the survey year, they were not based on the estimated growth from 1977 to 1981 but rather the growth from 1977 to 1980. This one-year lag had negligible effect on the estimates, particularly at the total manufacturing level where the adjusted base-year difference accounted for less than 1 percent of the estimate for total value of shipments.

These adjusted base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1978-1981. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.

The 1982 sample data included in table 3d were also developed using difference estimates. However, since the universe totals for the census year (1977 or 1982) were not known, a modification of the procedure described above was necessary. For each item in table 3d, except purchased services and breakdown of expenditures for new machinery and equipment (see further description in appendix A, section 2), linear

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The nonmail portion of the survey includes all single-unit establishments that were tabulated with less than five employees in the 1977 Census of Manufactures. Although this portion contained approximately 125,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of other Federal agencies. This administrative record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under special conditions, which safeguard the confidentiality of both tax and census records. Estimates for data for these small establishments were developed using industry averages in conjunction with the administrative information.

The corresponding estimates for the mail and nonmail establishments were added together, along with the adjusted base-year differences as defined in Description of Estimating Procedures below. The remaining description of the survey sample relates only to the mail portion of the ASM sample.

All establishments with 250 employees or more in the 1977 census were included in the survey panel with certainty. These establishments collectively account for approximately 65 percent of the total value of shipments for manufacturing establishments in the 1977 census. Smaller establishments were sampled with probabilities ranging from 1.000 down to 0.005 in accordance with mathematical theory for optimum allocation of a sample.

The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. For establishments included in the 1977 Census of Manufactures, the measure of size depended directly upon each establishment's 1977 product class values and the historic variability of the year-to-year shipments of each product class. Roughly equivalent measures of size were assigned to postcensus birth establishments based on their industry codes and anticipated payroll and employment.

The method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight to differences in employment, value added, and other general statistics, for these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of establishments into and out of a given sample panel without introducing a bias into the survey estimates.

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Most of the ASM estimates for the years 1978-1981 were computed using a modified "difference estimate" formula. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1977 census published number for an item total and the linear ASM estimate of the total for 1977. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

This base-year difference was then adjusted to reflect the estimated growth at the four-digit or, in the case of product classes, five-digit based Standard Industrial Classification (SIC) level from 1977 to the year of the survey; for example, 1981. It should be noted that due to processing constraints, the growth factors lagged one year; i.e., if 1981 is the survey year, they were not based on the estimated growth from 1977 to 1981 but rather the growth from 1977 to 1980. This one-year lag had negligible effect on the estimates, particularly at the total manufacturing level where the adjusted base-year difference accounted for less than 1 percent of the estimate for total value of shipments.

These adjusted base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1978-1981. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.

The 1982 sample data included in table 3d were also developed using difference estimates. However, since the universe totals for the census year (1977 or 1982) were not known, a modification of the procedure described above was necessary. For each item in table 3d, except purchased services and breakdown of expenditures for new machinery and equipment (see further description in appendix A, section 2), linear

estimates of the publication totals from the ASM mail sample were adjusted by the difference between imputed census totals and the corresponding ASM mail sample estimates of these imputed totals. These imputed totals are obtained by applying industry average ratios to control item values at the establishment level. For example, an imputed total beginning assets figure is obtained by multiplying each establishment's total value of shipments by the industry (four-digit SIC) average for the ratio of beginning assets to shipments.

Separate estimates for the nonmail establishments were not developed. However, their contribution to the publication estimates is reflected in the difference adjustment.

The method of inventory valuation percentages included in table 3c was developed using both complete census information and ASM estimates. The percentages for the four major categories (LIFO, non-LIFO, valuation method not reported, and LIFO reported without associated value and reserve) were derived from the complete census and correspond to the values included in table 3d. The percentages for the specific non-LIFO methods of valuations (FIFO, average cost, specific costs, etc.) are ratio estimates developed from the ASM in conjunction with the census universe estimate for the total of the non-LIFO methods.

QUALIFICATIONS OF THE DATA

The estimates developed from the sample are apt to differ somewhat from the results of a survey covering all companies in the sampled lists but otherwise conducted under essentially the same conditions as the actual sample survey. The estimates of the magnitude of the sampling errors (the differences between the estimates obtained and the results theoretically obtained from a comparable, complete-coverage survey) are provided by the standard errors of the estimates.

The particular sample selected for the ASM is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Each of the possible samples would yield somewhat different sets of results, and the standard errors are measures of the variation of all the possible sample estimates around the theoretical, comparable, complete-coverage values.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. Except for table 3c, they are presented in the form of relative standard errors, the standard errors divided by the estimated values to which they refer. In table 3c, "absolute" standard errors of the estimates are presented.

In conjunction with its associated estimate, the relative standard error may be used to define confidence intervals (ranges that would include the comparable, complete-coverage value for specified percentages of all the possible samples).

The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all possible samples.
2. From two standard errors below to two standard errors above the derived estimate for about 19 out of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference that the comparable, complete-survey result would be within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates from a particular sample would differ from complete-coverage results by as much as one, two, or three standard errors, respectively.

For example, suppose an estimated total is shown as 50,000 with an associated relative standard error of 2 percent, that is, a standard error of 1,000 (2 percent of 50,000). There is approximately 67 percent confidence that the interval 49,000 to 51,000 includes the complete-coverage total and about 95 percent confidence that the interval 48,000 to 52,000 includes the complete-coverage total.

In addition to the sample errors, the estimates are subject to various response and operational errors: errors of collection, reporting, coding, transcription, imputation for nonresponse, etc. These operational errors would also occur if a complete canvass were to be conducted under the same conditions as the survey.

Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Bureau's review of the data for reasonableness and consistency. The small operational errors usually remain. To some extent, they are compensating in the aggregated totals shown. When important operational errors were detected too late to correct the estimates, the data were suppressed or were specifically qualified in the tables.

As derived, the estimated standard errors included part of the effect of the operational errors. The total errors, which depend upon the joint effect of the sampling and operational errors, are usually of the order of size indicated by the standard error, or only moderately higher. However, for particular estimates, the total error may considerably exceed the standard errors shown.

The concept of complete coverage under the conditions prevailing for the ASM is not identical to the complete coverage of the census of manufactures, as the censuses have been conducted. Nearly all types of operational errors that affect the ASM also occur in the censuses. The ASM and the censuses, are conducted under quite different conditions, and operational errors can be better controlled in the ASM than in the censuses. As a result, for many of the census figures, the errors are of the same order of size as the total errors of the corresponding annual survey estimates. The differences between the census and ASM operating conditions also disturb, to some degree, the comparability of the ASM and census data.

Any figures shown in the tables in this publication having an associated standard error exceeding 15 percent may be of limited reliability. However, the figure may be combined with higher-level totals, creating a broader aggregate, which then may be of acceptable reliability.

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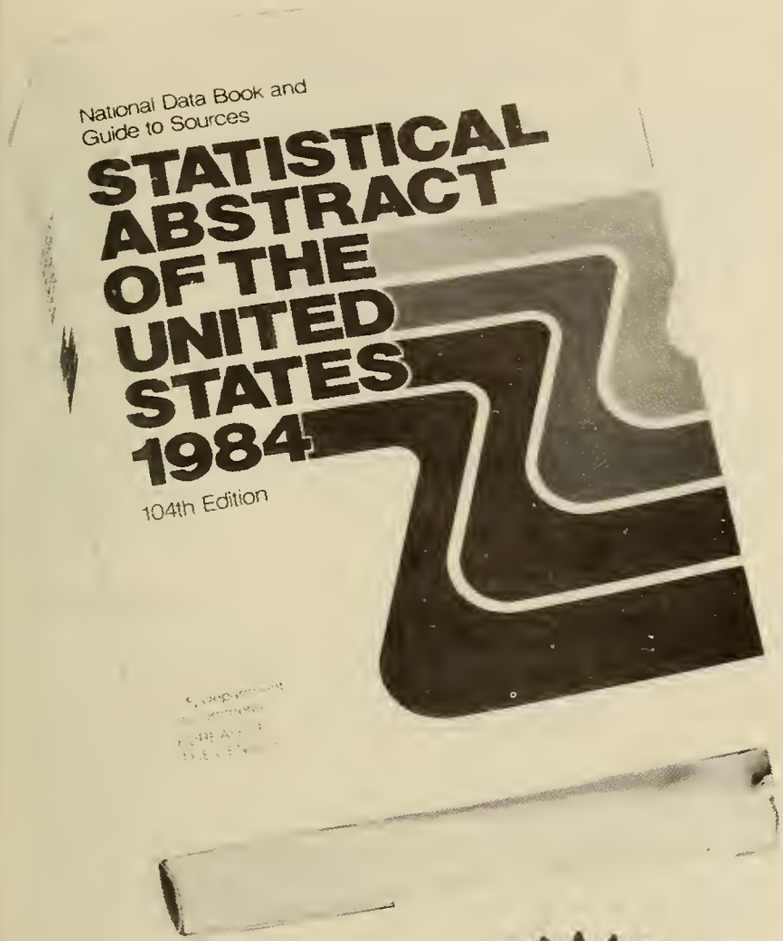

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